ALBERTA INDUSTRY & RESOURCES

1982 Edition

Alberta
CANADA

ALBERTA INDUSTRY & RESOURCES

Introduction

Alberta has continued to progress materially during 1982 although it has not been immune to the national and international economic malaise. We are confident that the present uncertainties, so apparent in this period of consolidation and retrenchment, will be succeeded by another period of rapid development. The basic regional resources of field, mine, and forest are those which are in greatest and most constant demand. Human and financial resources are available to ensure their effective utilization.

Presented in this publication are statistical data and analytical descriptions concerning the industries and resources of the province. They are general in nature to provide background information for both market research and for lay readers: more specific data and informative detail are available from the Department.

ISSN0319-5937

Alberta
ECONOMIC DEVELOPMENT

Table of Contents

	Page
List of Tables	IV
List of Maps	VI
List of Graphs	VI
Acknowledgements	VII
Section 1: Province of Opportunity	1
Economic Accounts	6
Private and Public Investment	8
Alberta Heritage Savings Trust Fund	10
Alberta Financial Institutions	12
Personal Income	14
Net Value of Production	16
Section 2: Industries	19
Manufacturing	20
Agriculture	44
Minerals	61
Construction	71
Forestry	79
Commercial Fishing	86
Trapping	87
Tourism	88
	91
Petroleum and Natural Gas	95
Oil Sands	105
Coal	106
Electric Power	110
Energy Conservation	115
Section 4: Transportation	117
Highways	120
Aviation	124
Railways	127
Water Transport	128
Section 5: Market Data	129
Personal Income Tax Data	130
Retail Trade	138
Consumer Price Indices	145

Page

Section 6:The People 149

People 151
Census Data 153
Census Data Definitions 174
Government 175
The Environment 177
Manpower 178
Labour 182
Education and Training 183
Communications 188

Section 7: The Land 189

Geography 190
Geology 194
Climate 196
Water Resources 202

Section 8: Government Services to Business 205

Provincial Government Services 206
Federal Government Services 209

Index 211

List of Tables

Table		Page
1.1	Economic Accounts - Outlay Account of Gross Domestic Product in Constant (1971) Dollars - Alberta - 1971-1981	6
1.2	Economic Accounts - Consolidated Income and Outlay Accounts - Alberta - 1971-1981	7
1.3	Private and Public Investment in Alberta - 1948-1982	9
1.4	Alberta Heritage Savings Trust Fund - Distribution of Assets - 1977-1982	11
1.5	Chartered Banks: Assets and Liabilities in Alberta - 1972-1981	13
1.6	Selected Financial Information - 1971-1981	13
1.7	Components of Personal Income - Alberta - Selected Years - 1935-1980	14
1.8	Total Personal Income and Per Capita Personal Inco. ": Canada, Western Canada, and Alberta - Selected years - 1935-1980	15
1.9	Total and Per Capita Net Value of Production: Canada, Western Canada, and Alberta - Selected Years - 1935-1979	16
1.10	Census Value Added in Goods-Producing Industries - Alberta - Selected Years - 1935-1981	17
1.11	Net Value of Production in Commodity Producing Industries - Alberta and Canada - 1979	18
2.1	Value of Manufacturers' Factory Shipments, by Industrial Groups - Alberta - Specified Years - 1951-1981	23
2.2	Principal Manufacturing Statistics, Selected Centres by Census Division - Alberta - 1979	24
2.3	Principal Manufacturing Statistics by Industry - Alberta - 1979	26
2.4	Principal Manufacturing Statistics by Industry - Census Divisions - Alberta - 1979	33
2.5	Principal Manufacturing Statistics by Industry - Calgary, Alberta - 1979	39
2.6	Principal Manufacturing Statistics by Industry - Edmonton (Metro), Alberta - 1979	40
2.7	Principal Manufacturing Statistics by Industry - Lethbridge, Alberta - 1979	41
2.8	Principal Manufacturing Statistics by Industry - Medicine Hat and Area - 1979	42
2.9	Principal Manufacturing Statistics by Industry - Red Deer, Alberta - 1979	42
2.10	Annual Investment in Manufacturing, by Industrial Group - Alberta - 1950-1982	43
2.11	Farm Cash Receipts from Farm Operations - Alberta - 1971-1981	47
2.12	Income of Farm Operators from Farming Operations - Alberta - 1971 and 1976-1981	49
2.13	Farm Operating Expenses and Depreciation Charges - Alberta - 1971 and 1976-1981	49
2.14	Farm Machinery and Equipment, by Type, by Census Division - Alberta - 1981	51
2.15	Census Farms by Number, Area, Type of Operator and by Gross Value of Products Sold by Census Division - Alberta - 1981	53
2.16	Census Farms with Sales Over $2,500 by Major Product, by Census Division - Alberta - 1980	55
2.17	Animal Slaughterings in Inspected Establishments - Alberta - 1959-1981	60
2.18	Livestock and Poultry on Farms, by Census Division - Alberta - 1981	60
2.19	Principal Statistics of the Mining Industry - Alberta - 1965-1979	68
2.20	Volume and Value of Mineral Production - Alberta - Specified Years - 1941-1981	69
2.21	Volume of Mineral Production* - Alberta and Canada - 1971 and 1979-1981	70
2.22	Production and Disposition of Sulphur - Alberta - 1971-1981	70
2.23	Value of Construction Work Performed by Principal Type Construction - Alberta - 1971 and 1979-1982	71
2.24	Dwelling Starts by Month, Urban Centres of 10,000 Population and Over - Alberta - 1971-1981	72
2.25	Dwelling Starts, Completions and Under Construction - Alberta and Selected Cities - 1971 and 1976-1981	72
2.26	Value of Building Permits - Census Divisions and Selected Municipalities - Alberta - 1971 and 1976-1981	74
2.27	Value of Building Permits by Type - Selected Cities - Alberta - 1971 and 1976-1981	76
2.28	Value o ' Construction Work Performed by Detailed Type of Construction - Alberta - 1971 and 1977-1982	77
2.29	Area - Crown and Private Land - Alberta - 1981	83
2.30	Managed Forest Lands, by Forest - Alberta - 1982	83
2.31	Timber Volumes by Species - Alberta	83
2.32	Forest Production by Volume and Value on Crown Lands - Alberta - 1981-1982	84
2.33	Annual Volume of Timber Production on Crown Lands, by Type of Product - Alberta - Fiscal Years 1972-1981	84
2.34	Reforestation Activity, Alberta Forest Service (AFS) and Alberta Forest Industry (AFI) Firms - Alberta - 1971/72-1980/81	85
2.35	Fisheries Production - Alberta - 1961-1982	86
2.36	Fur Production and Value of Fur Pelts - Alberta - 1960-1982	87
2.37	Persons and Vehicles Entering Through Canada Customs Ports, and Visitors to National Parks - Alberta - 1971 and 1976-1981	90
2.38	Estimated Tourism Receipts from Resident and Non-Resident Travel - Alberta - 1971-1981	90
3.1	Remaining Established Reserves of Fossil Fuels - Alberta	93
3.2	Estimated Remaining Ultimate Potential Reserves of Fossil Fuels - Alberta	93
3.3	Oil and Gas Well Depth Drilled - Wells Completed and Year End Status - Alberta - 1971 and 1976-1981	96
3.4	Annual Production of Liquid Hydrocarbons and Natural Gas by Types - Alberta - 1967-1981	100
3.5	Canadian Natural Gas Production* - by Province and Territory - Selected Years - 1947-1981	100
3.6	Canadian Crude Oil Production - by Province and Territory - Selected Years - 1947-1981	101
3.7	Production of Crude Oil by Field - Alberta - Selected Years - 1914-1981	101

Table		Page
3.8	Estimated Remaining Established Reserves of Liquid Hydrocarbons - by Province - Canada - 1971 and 1976-1981	102
3.9	Estimated Remaining Established Reserves of Marketable Natural Gas, by Province - Canada - 1971 and 1976-1981	103
3.10	Petroleum Industry Expenditures - Alberta and Canada - Selected Years - 1947-1981	103
3.11	Alberta Government Revenue from Mineral Resources - Fiscal Years - 1973/74-1981/82	104
3.12	Remaining Established Reserves of Coal in Alberta - 1981	109
3.13	Disposition of Alberta Coal - 1967-1981	109
3.14	Supply of Electrical Energy - Alberta - 1968-1981	112
3.15	Disposal of Electrical Energy, by Type of Consumer - Alberta - 1967-1981	112
3.16	Electric Utilities' and Industrial Establishments' Revenue from Sale of Electricity - Alberta - 1970-1980	113
3.17	Net Capacity and Net Generation by Type of Source and by Utility - Alberta - 1981	113
3.18	Relative Capacity and Generation by Energy Resource and by Ownership - Alberta - 1981	114
3.19	Energy Consumption in Alberta* - 1981	115
4.1	Highways and Roadways, Graded, Gravelled, Oil Treated and Paved - Rural Areas - 1972-1981	122
4.2	Motor Vehicle Registrations by Type - Alberta - 1967-1981	123
4.3	Landings Plus Take-offs, Itinerant and Local Flights, Selected Airports - Alberta - 1971 and 1976-1981	124
4.4	Number of Passengers Enplaned Plus Deplaned, Scheduled Airline Flights - Edmonton and Calgary Airports - 1964-1980	126
4.5	Deplaned Plus Enplaned Airmail and Cargo Freight - Calgary and Edmonton Airports - 1964-1980	126
4.6	Northbound Water Freight Shipped Via Fort McMurray and Hay River - 1961-1982	128
5.1	Total and Per Capita Reported Taxable and Non-Taxable Income by Census Division - Alberta - 1961, 1971, 1979	130
5.2	Average Income of Taxable Persons, by Occupational Classes - Alberta - 1971 and 1973-1979	131
5.3	Distribution of All Taxfilers Returns (Taxable and Non-Taxable) by Sources of Income - Alberta and Major Cities - 1972-1979	132
5.4	Number of Taxfilers by Income Classes - Alberta and Major Cities - Selected Years - 1965-1979	134
5.5	Number of Taxable Returns, Average Taxable Income, Total Taxable Income - Alberta Cities - Specified Years - 1971-1979	135
5.6	Numbers and Declared Personal Income of Taxfilers by Ages - Alberta - 1975-1979	136
5.7	Retail Trade by Type of Outlet - Alberta - 1972 and 1977-1981	138
5.8	Retail Trade by Major Groups - Census Divisions and Cities* - 1973-1978	139
5.9	Cheques Cashed in Clearing Centres by Type of Account - Alberta - 1970-1981	143
5.10	Consumer Price Index, All Items - Canada - 1914-1981	145
5.11	Component Group Indexes of the Consumer Price Index - Canada - 1967-1981	146
5.12	Component Group Indexes of the Consumer Price Index - Edmonton and Calgary - 1974-1981	146
5.13	Consumer Price Index for Regional Cities - Canada - 1949-1981	147
5.14	Industry Selling Price Indexes by Major Groups, Industries and Selected Commodities - Canada - 1971-1981	148
6.1	Population by Census Divisions - Alberta - 1961, 1971, 1976, 1981	154
6.2	Population - Rural and Urban, Numerical and Percentage Distribution - Alberta - Selected Years - 1901-1981	154
6.3	Population of Cities, Towns and Villages and Percentages of Total Population - Alberta - Selected Years - 1901-1981	155
6.4	Population of Incorporated Cities, Towns and Villages - Alberta - Selected Years - 1931-1981	155
6.5	Population for Census Divisions, Urban Size Groups and Rural Alberta - 1981	162
6.6	Population by Mother Tongue, by Census Divisions and Cities Over 10,000 - Alberta - 1981	162
6.7	Population by Religious Denomination for Census Divisions - Alberta - 1971	163
6.8	Population by Ethnic Group for Census Divisions - Alberta - 1971	164
6.9	Population 15 Years and Over, by School Attendance, Showing Level of Schooling - Alberta - 1976	165
6.10	Population by Specified Age Groups in Census Divisions - Alberta - 1981	166
6.11	Families by Number of Persons for Census Divisions and Municipalities of 5,000 Population and Over - Alberta - 1981	166
6.12	Families by Family Structure, for Census Divisions - Alberta - 1981	168
6.13	Private Households by Number of Persons for Census Divisions and Municipalities of 5,000 Population and Over - Alberta - 1981	168
6.14	Occupied Private Dwellings by Tenure, Showing Structural Type, for Census Divisions - Alberta - 1976	170
6.15	Population by Birthplace by Census Divisions - Alberta - 1971	171
6.16	Population 5 Years and Over Showing Mobility Status 1976, for Census Division of Residence - 1971	171
6.17	Components of International and Interprovincial Migration - Alberta - 1969/70-1980/81	172
6.18	Migration of Persons Between Alberta and Other Provinces - Specified Periods - 1961-1981	172
6.19	Population, Births, Marriages, Deaths, and Rates - Alberta - 1937-1981	173
6.20	Labour Force - Male and Female and Participation Rates by Age Group - Alberta - 1951, 1961, 1971	179
6.21	Labour Force - Male and Female and Participation Rates by Age Group - Alberta - 1975-1981	179
6.22	Population of Working Age, In and Not In Labour Force, Employed and Unemployed, and Participation Rates - Male and Female - Alberta - 1973-1981	180
6.23	Employed Labour Force by Industry*, Annual Averages - Alberta - 1975-1981	181
6.24	Employed Labour Force by Occupation, Annual Averages - Alberta - 1975-1981	181
6.25	Students in Public and Separate Schools, in Universities and in Public Colleges - Alberta - Selected Years - 1905/06-1980/81	185

Table		Page
6.26	Number of Schools, School Rooms, Teachers and Student/Teacher Ratios, in the Alberta Public School System - Selected Years - 1905/06-1980/81	185
6.27	Apprentices Registered and Certificated, Educational Requirements, and Length of Apprenticeship Training Period - Alberta - 1981	186
6.28	Apprentices Registered, Attending School, Receiving Certification, and Examinations Written - Alberta - 1971-1981	187
7.1	Standard 30 Year (1951-1980) Normals of Temperature, Precipitation, and Frost - Representative Locations - Alberta	197
7.2	Monthly and Annual Discharges, Selected Alberta Rivers - Specified Periods	204

List of Maps

Map Title	Page
Alberta in the World - Great Circle Distances in Kilometres	VIII
Census Divisions and Municipalities	5
Wheat - Alberta	46
Canola (Rapeseed) - Alberta	48
Barley - Alberta	50
Rye - Alberta	52
Oats for Grain - Alberta	54
Flaxseed - Alberta	56
Hogs - Alberta	57
Beef Cattle - Alberta	58
Milk Cows - Alberta	59
Minerals for Construction Materials Industries - Alberta	62
Minerals for Chemical and Metallurgical Industries - Alberta	64
Metallic Minerals - Alberta	66
Forest Resources - Alberta	80
Potential Annual Forest Yield - Alberta	82
National Parks, Provincial Parks, Forestry Areas - Alberta	89
Oil, Gas, Oil Sands - Alberta	94
Main Pipelines, Refineries, Gas Plants - Alberta	97
Movements of Oil Within, To and From Canada	98
Movements of Natural Gas Within, To and From Canada	98
Coal - Alberta	107
Movements of Coal Within, To and From Canada	108
Electric System - Alberta	111
Primary Highways and Roads	119
Distances in Kilometres and Average Driving Times from Principal Centres in North America to the Alberta Border	121
Airlines - Alberta	125
Population Distribution - Alberta	150
Major Physiographic Divisions - Alberta	192
Soils - Alberta	193
Bedrock Geology	195
Precipitation - Alberta	199
Average Frostfree Days - Alberta	200
Mean Temperature - Alberta	201
Mean Annual River Discharges - Alberta	203

List of Graphs

Graph Title	Page
Net Value of Production, Percentage Breakdown by Industry - Alberta and Canada - 1979	18
Gross Value of Shipments, Manufacturing Industries - Alberta - 1961, 1971, 1981	23
Relative Values of Structural Materials and of Non-Metallic Minerals Produced - Alberta	68
Confirmed Reserves and Estimated Ultimate Potential Reserves of Fossil Fuels - Alberta	92
Life Indices of Conventional Oil, Marketable Gas and Pentanes Plus	99
Relative Values of Fuels Produced - Alberta - 1951-1981	99
Population by Sex and Specified Age Groups - Alberta - 1961. 1971, 1981	153

Acknowledgements

The information and data in this publication have come from a wide variety of sources.

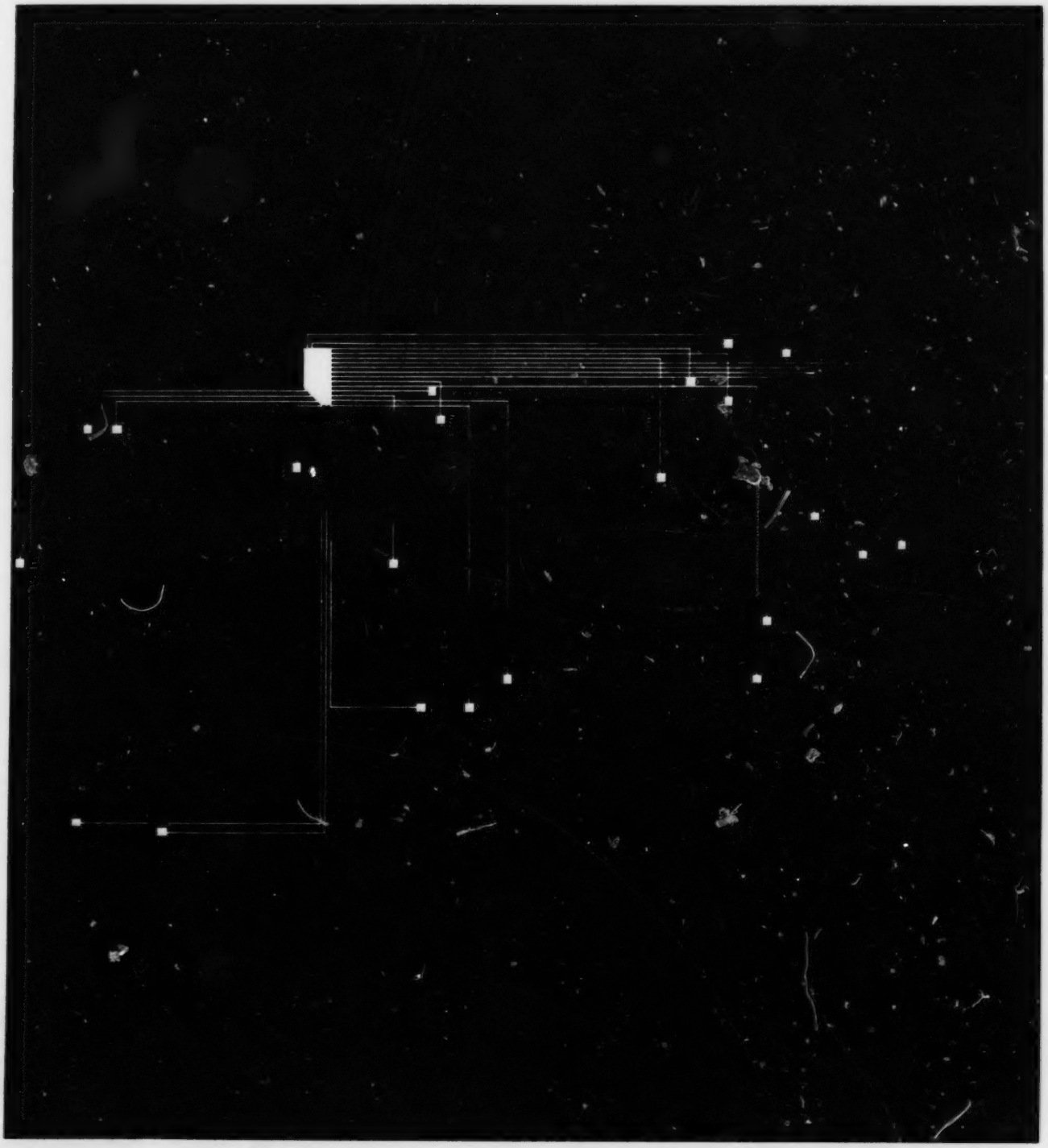
Much of the data comes from either Statistics Canada or the Alberta Bureau of Statistics. Our debt to these organizations is gratefully acknowledged. Other statistics come from a number of Alberta government departments and agencies. At the time of going to press, the data herein published were the latest available; however, new information is being developed regularly and statistics are continually being updated, particularly the 1981 Census data.

Wherever possible, articles were obtained from knowledgeable officials in a variety of Alberta government departments and agencies. Officials of these departments welcome further enquiries on their areas of specialty and will supply additional background information not available within the scope of this publication.

We also wish to thank the Alberta government agencies involved in the updating and provision of maps and photographs, and those who assisted in ensuring accuracy and reliability through suggestions and criticisms through the drafting and editing stages.

Alberta Economic Development
Edmonton, Alberta
December, 1982

Alberta in the World



Distances in Kilometres

Province of Opportunity

Province of Opportunity

Through an accident of history, modern North America and Canada, were discovered, settled and developed from the east instead of from the west. Rich in agricultural land, minerals, forests, energy resources, and scenic and climatic diversity, western Canada is becoming a major economic and industrial region of the country.

In the hundred years since Canada became a nation and Rupert's land was taken over from a company of adventurers, western Canada has progressed from a fur trappers' fiefdom, through a rough and severe era of dependency on subsistence farming, ranching, and lumbering, to another era in which it is reassessing its resources and expecting recognition of its changed prospects. Over the century of achievement the land was settled and brought under plow and reaper and axe; modern cities were built offering the amenities and cultural opportunities of those in much older societies. Road, rail and airway connections were built to world standards. High quality educational, medical, and social welfare systems were installed. Scientific and technological knowledge was harnessed for the development of mineral, industrial, agricultural and forestry resources. Just as no nation is an island unto itself, so these achievements owe much to the human, the intellectual, the financial, and the scientific assistance which was poured in from other regions of Canada and from other countries. At the same time, the basic natural resources for exploitation had to be present, coupled with a welcome and a willingness of governments and people to take advantage of, and to pay for, the proffered aid.

British Columbia is rich in timber, minerals, hydro-electric energy, and fertile valleys. Alberta has an abundance of agricultural land, petroleum energy resources, and forests. Saskatchewan has rich agricultural land, uranium and petroleum energy resources and vast deposits of other minerals, particularly potash, basic to many crop fertilizers. Manitoba features hydro-electric energy, mineral resources, good farmland and occupies a strategic position in the centre of Canada. All four provinces have an ethnically diverse population, many inhabitants only a generation removed from the pioneers who settled and opened up the land. Western Canada can be looked at as a whole market and resource unit with many common features.

From the perspective of the 1980's, Alberta's economic evolution has been of two parts dated accidentally, but neatly, as pre- and post-Second World War. In the early period, Alberta had an agricultural economy subject to the annual fluctuations of market prices and weather vagaries. Buoyant prosperity alternated with struggles for survival — physical and financial. In the more recent period, the discovery and exploitation of petroleum energy reserves, coupled with general world-wide prosperity and stability of market demand, brought broader-based economic development featuring mining, nascent manufacturing industries, commercial expansion, and construction of the physical plant to support and accommodate growth. In very recent years, the surge in energy prices has resulted in increased resource revenues which the government is endeavoring to manage wisely and effectively, aiming to strike a balance between the needs and desires of the present, and an obligation to use part of a current surplus to build a strong economic base for the future.

All major industries have shown sustained growth and diversification in the post-war period. New crops, such as canola, and new and better varieties of other grains and field crops have been developed and accepted. Livestock breeds and feeding methods have been successfully adopted and adapted. Storage facilities have evolved making local field crop produce available almost year round. Refrigerated transportation makes the local slaughtering and processing of livestock for external markets economically feasible.

The story of the petroleum mining boom is well known. Natural gas is exported deep into the United States, and as far east as Montreal, in Canada. Until recently, large volumes of crude oil were also exported to the United States. The spin-off and multiplier effects of the mining boom were the more important and long-lasting. In the post-war period, some $70 billion of new capital investment was brought into western Canada, the bulk of it into Alberta. Support and service industries flourished. Manufacturing plants, using petroleum products either as raw materials or as energy sources, were introduced; other types of manufacturing plants were successful because of the general increase in economic activity and incomes. Government revenues from the mining industry were such that most taxes remained low or were even abolished.

Perhaps the greatest effect, however, was the unquantifiable impact on the morale and self-confidence of Albertans in knowing that, for a foreseeable future, they would live in a reasonably secure and stable economic environment.

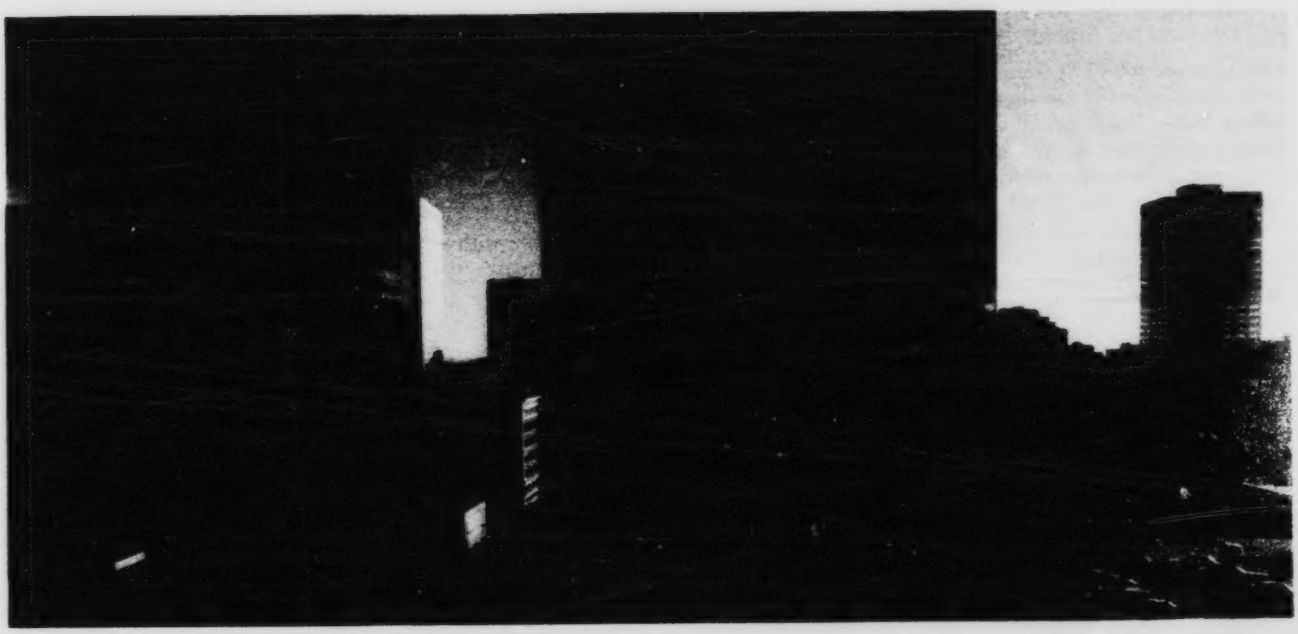
Manufacturing output is increasing steadily in terms of both growth and diversity. A basis is being laid for future expansion and evolution. The heavy dependence on central Canadian and foreign sources of manufactured products is being gradually eroded. Population increases and the even more rapid increases in general economic activity,

make the province ever more attractive as a viable manufacturing base.

To provide the physical infrastructure for a growing population and for the service and support facilities which are among the visible manifestations of economic growth, the construction industry has been extremely active. On a per capita basis, Alberta's annual construction volume has been the highest in Canada for much of the post-war period. The changed cities and landscapes, the quality of traffic arteries, the thousands of kilometres of buried pipeline, and the huge industrial plants extracting petroleum from the oil sands, all attest to the success and diversity of the construction industry.
Market opportunities for products and skills exist for those who have the initiative, intuition and drive to seek and develop them. Local, regional and Canadian markets are limited only by population size factors and by the development stages of other forms of industry or commerce. The two million persons of Alberta, the seven million of western Canada, and the twenty-four million of Canada, all offer distinct sizes and types of markets for different sizes and types of firms. Each of those market groups has doubled in size over the past three decades; enterprises which would not have been viable in 1950, can be in 1980. Many enterprises not viable in the past because of lack of related and complementary firms with their ranges of products, can be successful today because of industrial development in other fields. Industrial opportunities in Alberta are increasing rapidly.

Exports to American markets have generally been restricted to raw and semi-processed materials. Population concentrations directly to the south are lacking, except along the Pacific coast, making it unrealistic to anticipate southerly flows of trade for many consumer goods. There are large, though variable and uncertain, markets for lumber products, petroleum and semi-processed petrochemical raw materials, chemical fertilizers, and minerals. For most of these, so-called "world scale" or very large organizations and plants are necessary. Many Canadian consumer goods cannot be competitively priced due to the larger sizes of American plants built to serve their own larger markets, and to the tariffs which still shield their own producers. Nevertheless this does not negate the wisdom of exploring individual export opportunities for processed goods, particularly those incorporating specialized design or technology.

Another exciting and promising development in the post-war period has been the dramatic industrialization of the so-called "Pacific Rim", Asian countries. At this time they represent a prime



undeveloped market for raw and upgraded products of mines, fields, and forests. Already, they take significant volumes of coal, grains and forest products. In none of these does Canada have a monoply nor, given their market status, do Pacific Rim countries have any special obligation to funnel or direct their purchases to Canada. The only certainty is the potential size of the trade opportunity. Realism in prices, wages, profit margins, and production efficiency is required to share in it.

Western Canada, and specifically Alberta, does have some inherent industrialization disadvantages to overcome. The major population concentrations of North America and of other countries are distant; given its immense area the regional population is still relatively sparse as well. Older, longer settled regions have longstanding advantages and vested interests in established financial and industrial complexes. Western Canada has not yet amassed its own pools of financial and human capital to use in independent self-development — though this constraint may fade relatively rapidly.

Although progress has been significant, especially in the post-war period, the industrial complex of western Canada is not yet an interlocking, self-generating, self-perpetuating, melded group of plants. Most major plants were built to process raw materials for finishing plants in other regions closer to large markets.

Regional advantages, however, are potent forces. The harnessing of energy has been the distinguishing factor of the industrial revolution of modern times. An abundance of energy resources is a central and major advantage possessed by Alberta. Whether used regionally for industrial development, or exported to other regions, it is of an intrinsic advantage to the possessors. Long term assurance of supply will likely become an increasingly important factor in industrial location decisions.

Coal, natural gas and petroleum resources are present in abundance. No less impressive is the list of other mineral, timber and agricultural resources in terms of both volume and variety.

Alberta welcomes industry and industrial growth. In recent years significant caveats have been placed on development to ensure environmental protection of land, water, air and health, but such restrictions are becoming a universally accepted and welcomed phenomena. Public acceptance of industrial growth is based on the desires for security of employment, wider ranges of choice of occupations, and for the opportunities to acquire the products of technology and science.

Outside investment, whether national or foreign, is welcomed, largely because locally generated capital is inadequate to finance the major large scale industrial developments of recent years. Large capital infusions are usually accompanied by the managerial and technical expertise needed to ensure that they are used efficiently, effectively, and profitably. In the process, a generation of native talent is being trained.

The Alberta government is supportive of the free enterprise philosophy. It encourages business activity that operates in a manner compatible with continuing economic development and protection of the local public interest. Health, safety, and work standards are set and enforced. Labour and management bargaining procedures are laid down and supervised. Labour force training through schools, universities, technical institutes and apprenticeship programs is provided and encouraged.

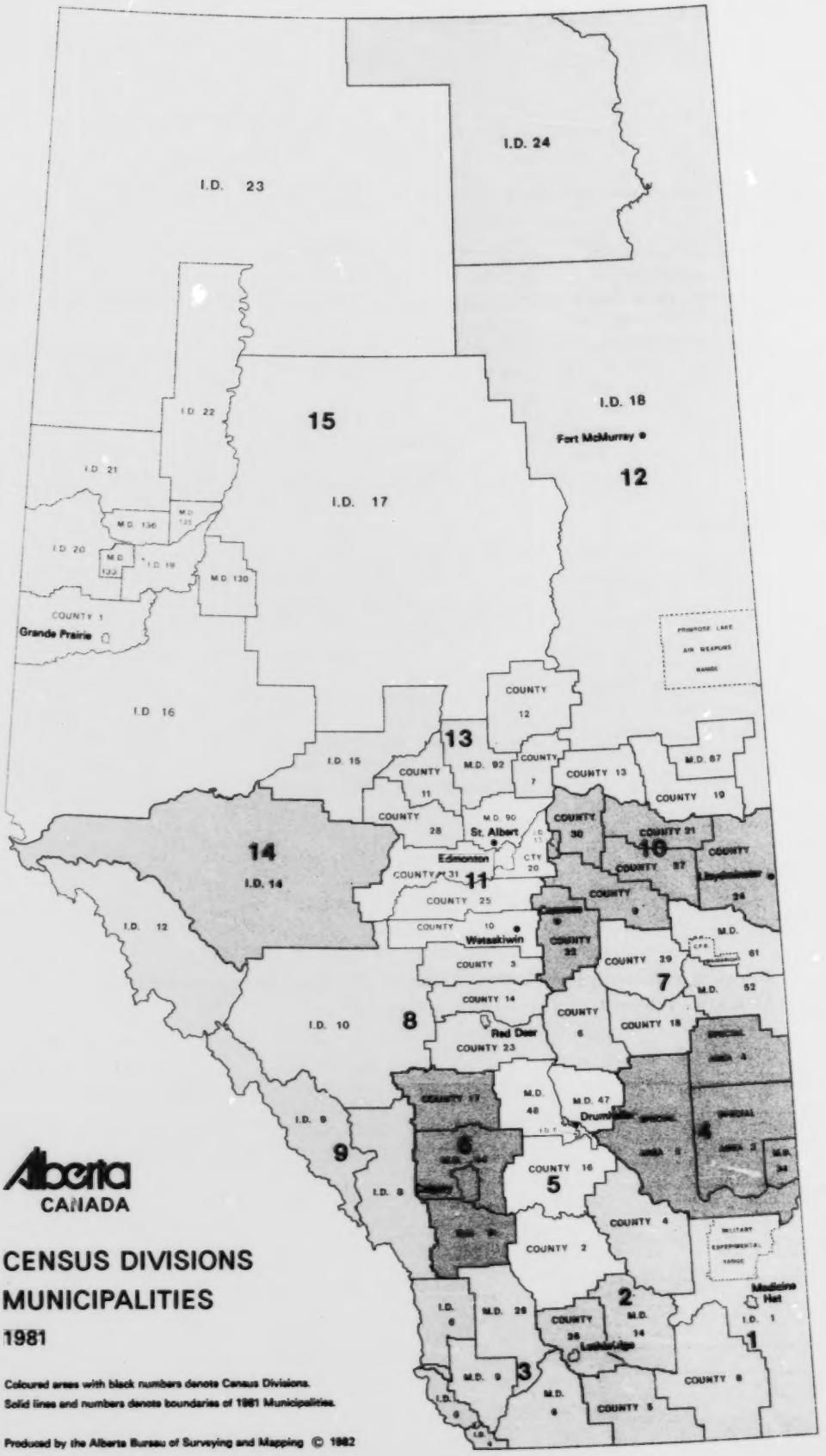
Though the vast bulk of industrial development is expected to be unassisted and privately financed, measures are in place for aiding small businesses, both urban and rural.

At the other end of the scale, assistance and arrangements are made to encourage and stimulate the huge natural resource developments which put strains on even the largest private companies.

It is both feasible and probable that the pace of Alberta's industrial and population growth will, for the foreseeable future, far exceed that of less favoured areas. Petroleum and natural gas are likely to remain the preferred energy sources, both because of their transportation advantages and because of the tremendous existing capital investment in machines and industries which have been developed to use them. Although conventional resources of petroleum are becoming more scarce, the tremendous quantities contained in the oil sands are defined, and initial attempts at extraction and processing are proving successful, though expensive. It is certain that tremendous amounts of financial capital will continue to be expended on oil extraction plants over the balance of this century and into the next. The industrial stimulus given to western Canada in the construction and maintenance of the plants, new towns and cities, the service and support facilities, is certain to exceed that which accompanied the development of the conventional oil resources during the last generation. Because of the industrial and commercial maturity which accrued then, it is likely that the multiplier and spin-off effects will be even greater in this second round.

If these regional developments can be accompanied by successful entry into wider markets, future industrial development prospects are very bright.

In the pages which follow are statements and data recording the economic progress of Alberta in recent years.



Alberta
CANADA

CENSUS DIVISIONS
MUNICIPALITIES
1981

Coloured areas with black numbers denote Census Divisions.
Solid lines and numbers denote boundaries of 1981 Municipalities.

Produced by the Alberta Bureau of Surveying and Mapping © 1982

Economic Accounts

The economic accounts of a specific geographic region are a measure of the total value of production during a given time frame. They are similar to the accounting practices of business enterprises in that they are used to measure economic performance over time. The value of production for Alberta is measured by valuing Gross Domestic Product (GDP), which is an estimate of the total value of goods and services produced within the boundaries of the province.

There are two methods used to estimate GDP for Alberta. The first is the income approach, which is a summation of the sources of income accruing to the factors of production. These include wages, salaries and supplementary labour income, farm income, unincorporated business income, corporation profits, interest and miscellaneous investment income, capital consumption allowances, inventory valuation adjustment, and indirect taxes less subsidies.

The outlay approach measures the consumption of goods and services by all final users: consumers, business and government; plus the value of physical change in inventories; plus exports minus imports. The sum of the values of goods and services sold for consumption or for capital formation should theoretically be equal to the value of income accruing to the factors of production. Due to statistical problems, these two approaches do not add to the same figures, the difference being the residual entry in both the income and outlay accounts.

The total value of production (outlay account) can be separated into price and quantity components. When quantities are measured by the prices prevailing in the year in which production took place, the value of production is called GDP in current dollars. When all production is measured with the market prices which existed in a previous base year (i.e., 1971), it is said that production is measured in constant dollars. Measuring production in constant dollars removes the component of growth due to price changes, or inflation, and provides a measure of real economic growth for the province.

First estimates show that the Alberta GDP reached $47.2 billion in 1981 in current dollars. This represents an average annual growth rate of 19.7 per cent over the 1971 value of $7.8 billion. When measured in constant (1971) dollars, the value of real GDP for 1981 was $14.7 billion, a real average yearly growth of 6.5 per cent over 1971. Both the current and constant dollar estimates indicate that growth in the Alberta economy has been very strong during the past decade.

Table 1.1 **Economic Accounts - Outlay Account of Gross Domestic Product in Constant (1971) Dollars - Alberta - 1971—1981** (millions of dollars)

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Sales to Persons											
Sales to Government											
Gross Fixed Capital Formation											
Residential Construction											
Non-Residential Construction											
Machinery & Equipment											
Value of Physical Change in Inventories											
Non-Farm											
Farm & Grain in Commercial Channels											
Exports											
Imports											
Residual											
Gross Domestic Product in Constant (1971) Dollars											

Table 1.2 Economic Accounts - Consolidated Income and Outlay Accounts - Alberta - 1971-1981

(millions of dollars)

Income Account	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Wages, Salaries and Supplementary Labour Income											
Military Pay and Allowances											
Net Income of Non-Farm Unincorporated Business											
Net Income of Farm Operators from Farm Production (1)											
Corporation Profits											
Interest and Miscellaneous Investment Income											
Inventory Valuation Adjustment											
Indirect Taxes											
Subsidies											
Capital Consumption Allowances											
Business											
Government											
Residual											
Gross Domestic Product at Market Prices											

Outlay Account	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Sales to Persons											
Sales to Government											
Gross Fixed Capital Formation											
Government											
Residential Construction	3	3	2	3	3	3	3	5	5	6	7
Non-Residential Construction	238	257	288	434	665	827	720	949	1,119	1,193	1,581
Machinery and Equipment	30	31	47	82	77	86	97	130	165	199	245
Business											
Residential Construction	486	542	680	730	880	1,174	1,542	1,956	2,607	2,825	3,106
Non-Residential Construction	887	947	1,184	1,498	2,095	2,481	3,044	3,930	5,027	7,015	8,262
Machinery and Equipment	552	677	817	1,081	1,494	2,322	3,466	4,562	5,915	3,636	4,629
Value of Physical Change in Inventories											
Non-Farm											60
Farm											185
Grain in Commercial Channels											32
Exports											
Imports											
Residual											
Gross Domestic Product at Market Prices											

Private and Public Investment

Investment volume is one of the key indicators of growth in an economy; even more it is an indicator of investor confidence in the security, profitability and prospects of industry in a given locale. By these criteria, Alberta has fared very well in the post-war period.

In 1950, total private and public investment in Alberta was estimated at $521 million with a per capita investment of about $570. By 1980, volume of investment had risen to $17,003 million, and per capita investment to $7,939. Even allowing for inflation, the relative figures are remarkable. In practical terms, they reflect both employment opportunities and general prosperity.

This remarkable increase in both volume and annual growth rates of investment can be attributed to two major economic developments, both involving the petroleum industry, that occurred over the thirty-year span. The first was the bringing into production of the conventional oil and gas resources, and, more recently, of the reserves contained in the Athabasca oil sands. The second was the sharp and sudden rise in the unit petroleum energy prices after 1973. Both developments triggered and spurred a range of related activities: population influxes, housing and commercial booms, increased local manufacturing and processing, high government revenues and expenditures, and the financial investments attracted by a flourishing and stable economy.

Primary industries and construction, particularly involving the petroleum mining industry, have accounted for between 28 per cent and 42 per cent of annual investments over the thirty-year span. In recent years, housing, utilities and services have been attracting increasing proportions. The proportion of investments in institutions and governmental facilities has declined from about one-fifth to about one-tenth of the annual totals.

Although precise figures are not available, the bulk of the investments in petroleum development and in manufacturing have been made by large firms. The pace of growth and volume of investments in these key industries have provided the necessity and justification for investment expenditures in other businesses and industries. The specific effects of these investments on employment and output are shown in the industry sections of this publication.

The 1979 growth rate in investment could not be maintained in the early 1980's due to the impact of the world wide economic recession. However, given the world shortages of petroleum energy resources, the known volumes of petroleum components locked in the oil sands, and the related industry growth which accompanies petroleum development, it is likely that the rates and volume of investments will rebound and continue to increase in the foreseeable future. The multiplier effects of this investment will also continue to be beneficial and stimulative throughout western and central Canada.

Table 1.3 **Private and Public Investment in Alberta - 1948-1982** (millions of dollars)

	Primary Industries and Construction	Manufacturing	Utilities & Communication	Trade Finance & Commercial Services	Housing	Institutional Services and Government Departments	Capital and Repair Expenditures		Total
							Construction	Machinery & Equipment	
1948									
1949									
1950									
1951									
1952									
1953									
1954									
1955									
1956									
1957									
1958									
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1972									
1973									
1974									
1975									
1976									
1977									
1978									
1979									
1980									
1981									
1982									

Alberta Heritage Savings Trust Fund

The Alberta Heritage Savings Trust Fund was established by an act of the Alberta Legislature in May, 1976. Subject to annual approval by the Legislature, 30 per cent of the provincial government's non-renewable resource revenues, which are derived primarily from crude oil and natural gas royalties, are transferred to the Fund. The monies set aside in the Fund are invested for the benefit of Albertans now and in the future. The objective of the Heritage Fund is to ensure that the province will be in a strong financial position when its resource revenues begin to decline.

By March 31, 1982 the Heritage Fund's assets had grown to $11 billion, representing the cumulative investment of transfers of resource revenue and the reinvestment of income since 1976. During 1981-82, the Fund received $1.4 billion in resource revenues and earned $1 billion in investment income.

The Heritage Fund has five investment divisions: the Capital Projects Division, the Canada Investment Division, the Alberta Investment Division, the Energy Investment Division and the Commercial Investment Division. The Heritage Fund Act specifies distinct investment criteria for each division. Funds not allocated to these divisions are invested in deposits and marketable securities.

Investments made through the Capital Projects Division must provide long term economic or social benefits to the people of Alberta. By their nature, these projects do not yield a monetary return to the Heritage Fund. Current areas of funding include health care facilities, irrigation, land reclamation, reforestation and recreation projects, agricultural research and research into heavy oil, oil sands and conventional oil enhanced recovery methods. Two major endowment funds have recently been established under the Division: the Alberta Heritage Scholarship Fund and the Alberta Heritage Foundation for Medical Research Endowment Fund. At March 31, 1982 the Capital Projects Division had deemed assets of $1.3 billion.

Through the Canada Investment Division over $1.9 billion has been lent to the governments, or agencies, of six other Canadian provinces. Further loans have been suspended in order to make available additional funds to meet priority needs within Alberta.

Over 55 per cent of the Fund's assets — $6.3 billion — is invested under the Alberta Investment Division. These investments must yield a reasonable return or profit to the Heritage Fund and tend to strengthen or diversify the economy of Alberta. Investments include Alberta's 16.74 per cent participation in the Syncrude oil sands project and 50 per cent ownership of the Alberta Energy Company, a number of corporate debentures, and long term loans to several provincial Crown corporations: the Alberta Home Mortgage Corporation, the Alberta Housing Corporation, the Alberta Agricultural Development Corporation, the Alberta Opportunity Company, the Alberta Municipal Financing Corporation and the Alberta Government Telephones Commission. These Crown corporations deliver a variety of programs that further the province's development objectives. For example, their activities include ensuring a supply of affordable housing in the province, and providing financing to the small business and farm sectors and to Alberta's municipalities for their capital needs. In addition the Heritage Fund will provide over $100 million in financing for a major grain terminal at Prince Rupert, British Columbia, that will facilitate the transportation of Alberta grain to overseas markets.

One $25 million investment in corporate debentures has been made to date under the Energy Investment Division, which has the objective of fostering the development, transportation and processing of Canada's energy resources.

Late in 1981-82, the first investments were made under the Commercial Investment Division with the objective of earning a commercial return or profit for the Heritage Fund. Initially up to $200 million is being invested in the common shares of a broad range of corporations representing a wide cross-section of industrial sectors in the Canadian economy.

At the end of 1981-82, $908 million was invested in a portfolio of deposits and marketable securities. As well as contributing to income, these investments serve the liquidity needs of the Heritage Fund.

Two important temporary changes to the Heritage Fund were announced in September, 1982. For a two-year period the income of the Heritage Fund will be used to fund special programs to help Albertans cope with the worst effects of high interest rates and the current economic downturn. In addition to the funding of this Economic Resurgence Plan, for two years commencing April 1, 1983, the proportion of non-renewable resource revenue transferred to the Heritage Fund will be reduced to 15 per cent from 30 per cent. The reduced transfer will make available additional funds to meet budgetary expenditures.

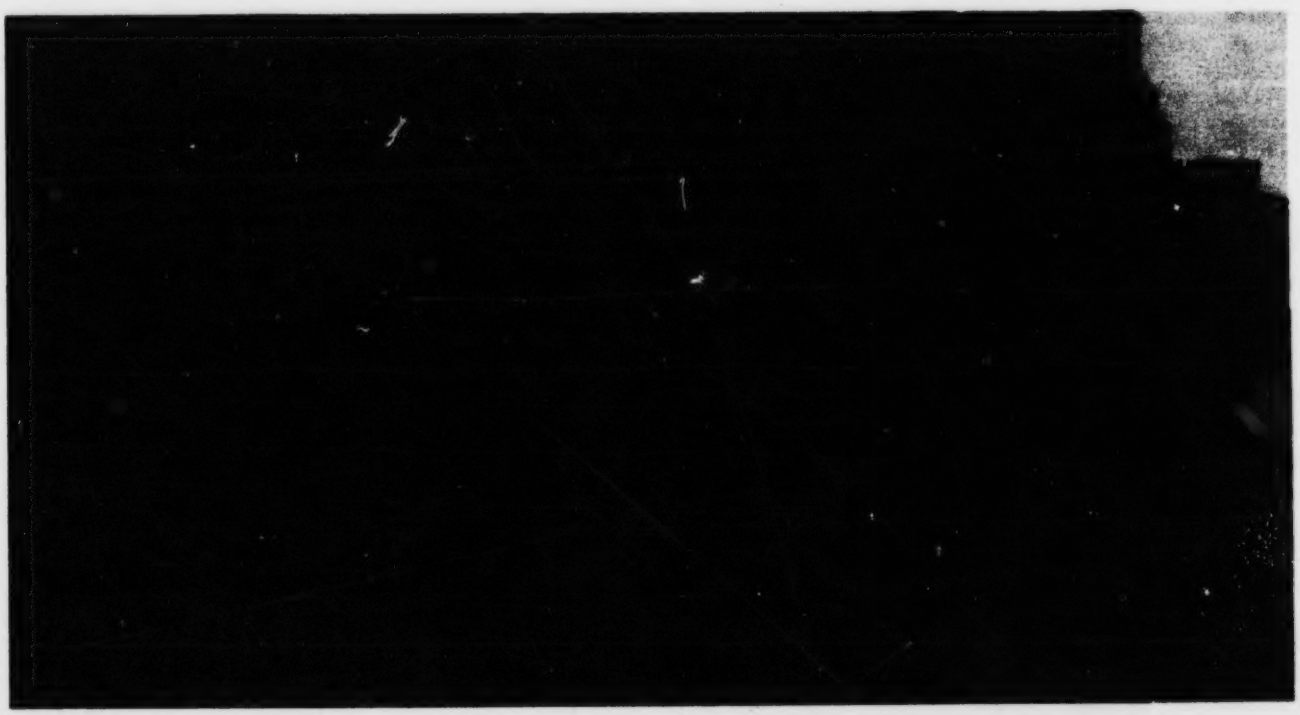
The Heritage Fund is held and administered by the Provincial Treasurer. Authority to make investments is vested in the Legislature, the Heritage Savings Trust Fund Investment Committee or the Provincial Treasurer, depending on the nature of the investment.

Table 1.4 Alberta Heritage Savings Trust Fund - Distribution of Assets - 1977-1982 (millions of dollars)

	1977 31 March	1978 31 March	1979 31 March	1980 31 March	1981 31 March	1982 31 March
Assets						
Alberta Investment Division[a]						
Energy Investment Division						
Canada Investment Division						
Commercial Investment Division						
Deposits, Marketable Securities and Other Assets						
Deemed Assets						
Capital Projects Division						
Total	2,218	3,374	4,705	6,419	8,579	11,009

a) The Alberta Investment Division includes AGT and AMFC debentures which were recorded as long term investments until 1979-80 when they were transferred to the Alberta Investment Division.

b) Investments decreased during 1979-80 due to the sale of debentures to the General Revenue Fund for cancellation under the Municipal Debt Reduction and Hospital Debt Retirement Programmes.



Alberta Financial Institutions

The financial sector in Alberta has grown rapidly over the past decade in response to strong economic growth and the energy boom. As commerce expanded, local industries flourished, some head office operations were shifted to Alberta, and the financial infrastructure broadened and deepened. This included the addition of new banks, trust companies, investment dealers and insurance companies both in terms of branch operations of out-of-province firms and of Alberta-based operations. A good deal of "decision making power" came to Alberta with these new institutions.

The Canadian banking industry in the province prospered over the past ten years and grew from just $1.4 billion in Alberta assets in 1971 to about $30 billion today. Over the period two new chartered banks were successfully established, one each in Calgary and Edmonton. As well the major Canadian banks shifted a growing amount of decision making power as regional offices were opened and senior executive officers moved to the province. Several major banks opened energy departments in Calgary to be close to the growth of the oil and gas industry and to be better positioned to participate in the expected energy megaprojects of the 1980's.

Another organization which grew rapidly over the period was the Treasury Branches' network, established in the 1930's to supplement financial services by the banking system. Total assets, over the decade, increased ten-fold from $270 million to $2.7 billion at the end of 1981.

One of the fastest growing financial sectors was the foreign bank area — Schedule B Bank — which witnessed growth from only a handful of institutions prior to 1976 to 22 in 1982. This reflected the foreign banks' assessment of the need for their services due to Alberta's material growth and increased international trade. The growth was made possible by the amendment of the Bank Act in 1981. One of these banks has its Canadian headquarters in the province.

Trust companies also flourished. Today over 50 different trust companies operate locally compared to about twenty in 1971. Several new Alberta-based trust companies were established: the number of major companies with headquarters in the province now amounts to about 10.

Investment dealers grew rapidly in size and number as well as in the scope of their activities. Many of the major eastern-based investment dealers opened corporate finance departments in Calgary to accommodate the financing needs of corporate treasurers especially as they related to the development of oil and gas resources. As well several home-grown operations were established dealing primarily in the energy sector.

Other Alberta financial institutions, which exhibited strong growth over the decade, include: credit unions (there were about 150 operating at the end of 1981 with total assets of $2.25 billion); venture capital companies (there are now five such companies based in the province); insurance companies (seven casualty/property and/or life insurance companies currently have headquarters in the province); investment advisors (who came to Alberta or emerged locally as the need for their services became apparent); mortgage companies, and finance companies.

Another integral part of the Alberta financial structure is the Alberta Stock Exchange which aided greatly in the growth of the oil and gas sector. Dollar volume of business on the exchange registered $427 million in 1981, a vast increase from the $12 million reported ten years earlier. Today 45 member firms belong to the Exchange and the stocks of about 335 companies are listed.

Table 1.5 **Chartered Banks: Assets and Liabilities in Alberta - 1972-1981** (millions of dollars)

	Assets			Liabilities		
31-Mar	Total	Residential Mortgages	Business Loans	Total	Fixed Term Deposits	Personal Savings
1972						
1973						
1974						
1975						
1976						
1977						
1978						
1979						
1980						
1981						

Table 1.6 **Selected Financial Institutions - Alberta - 1971-1981**

	Cheques Cashed in Alberta	Number of Chartered Bank Branches in Alberta	Alberta Employment in Finance Insurance & Real Estate	Alberta Stock Exchange Volume	
				Number of Shares	Dollars
	($ millions)		(000)		
1971					
1972					
1973					
1974					
1975					
1976					
1977					
1978					
1979					
1980					
1981					

Personal Income

Personal income, as discussed in this context, is a statistical concept useful for measuring changes over time and for making inter-regional comparisons. Since sources and methods of computation of figures are radically different, data should not be related or compared directly to the similarly titled personal income taxation statistics appearing in a subsequent section.

Personal income is defined herein as the estimated sum of wage and salary income of unincorporated businesses, investment income of persons, and government transfer payments to persons (excluding interest on the public debt and capital assistance).

Total and per capita values of personal income for Alberta, western Canada, and Canada for selected years 1935 to 1980 are shown in the accompanying table. Figures are in current dollars and thus include the effects of inflation as well as the increases attributable to population growth and the changes in industry emphases and developments. In 1980, Alberta accounted for 9.7 per cent of the personal income of Canada and 32.5 per cent of that of western Canada.

The proportions of personal income attributable by source have changed substantially over the past 40 years as Alberta evolved from an agricultural to a more diverse industrial and commercial based economy. Despite marked growth in dollar volume, the net income of farm operators from farm production has decreased from a quarter of total personal income to about one-twentieth. Wages and salaries now account for well over two-thirds of the total as compared to about two-fifths at the end of World War II. The proportion attributed to non-farm unincorporated (i.e. smaller) businesses has been halved as larger firms make an ever-increasing impact. Government transfer payments became increasingly more important as society increasingly approved income redistribution measures of governments.

In general terms, the personal income data reflect the relative affluence of individuals in provinces or regions. The prosperity and dynamic growth of Alberta have been widely publicized over the past three decades — and they are facts. Yet there is considerable confusion as to the relative affluence of governments and that of individuals.

The average per capita personal incomes of all Canadians, western Canadians, and Albertans appear in the accompanying table. It should be particularly noteworthy that, for most of the period, the Alberta individuals' average at best closely parallelled that of all Canadians, and was below that of the four western provinces combined. Only in very recent years have there been indications that the historical relationships are changing.

Table 1.7 **Components of Personal Income - Alberta - Selected Years - 1935-1980**

(money figures in millions of dollars)

	Wages Salaries & Supplementary Labour Income		Net Income Received by Farm Operators from Farm Production		Net Income of Non-Farm Operators from Farm Production		Interest Dividends and Misc. Investment Income		Government Transfer Payments		Other		Total	
	$	%	$	%	$	%	$	%	$	%	$	%	$	%
1935														
1940														
1945														
1950														
1955														
1960														
1965														
1970														
1975														
1976														
1977														
1978														
1979														
1980														

Table 1.8 **Total Personal Income and Per Capita Personal Income: Canada, Western Canada and Alberta - Selected Years - 1935-1980**

	Total Personal Income			Per Capita Personal Income		
	Canada	Western Canada	Alberta	Canada	Western Canada	Alberta
	(millions of dollars)			$	$	$
1935						
1940						
1945						
1950						
1955						
1960						
1961						
1962						
1963						
1964						
1965						
1966						
1967						
1968						
1969						
1970						
1971						
1972						
1973						
1974						
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1976						
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1979						
1980						

Net Value of Production

In any industry, net value of production is equal to gross receipts from the sales of goods minus the cost of raw materials, fuel and electricity required for their production. As a measure of the relative performance of industries, a net value is preferable to a gross value figure because it excludes contributions made by other industries to the production process. For example, to determine the relative importance to the economy of the bakery industry one would take the total of its sales receipts and subtract the cost of such ingredients as flour, milk, eggs, and fuel and power supplies which were produced by the agricultural, electric power and petroleum industries. The bakery industry's "total receipts" figure alone would give a misleading impression as to its relative importance as compared with other industries under study. Value added and net value of production are equivalent terms.

Only those industries which produce some physical product are included in the net value of production data series. Businesses which make important contributions to the economy, but which are excluded from the series include retailers, wholesalers, service trades firms, the government, transportation industries and financial firms.

It is to be noted that net value of production should not be confused with profit since the former includes all salaries and wages, taxes, rents, overhead costs, and machinery replacement costs, as well as residual dividends and profits.

The net value of production figures in this section have been compiled to show the relative contributions of the commodity producing industries of the province for some representative years; a number of national figures are given to show differences in production patterns.

In the past 40 years there have been major changes in the structure of the Alberta economy. An analysis of the various industries shows very clearly the shift from a basically agrarian economy to one in which mining

Table 1.9 Total and Per Capita Net Value of Production: Canada, Western Canada and Alberta -Selected Years - 1935-1979

	Net Value of Production			Per Capita Net Value of Production		
	Canada	Western Canada	Alberta	Canada	Western Canada	Alberta
	(millions of dollars)			$	$	$
1935						
1940						
1945						
1950						
1955						
1960						
1965						
1966						
1967						
1968						
1969						
1970						
1971						
1972						
1973						
1974						
1975						
1976						
1977						
1978						
1979						

(including petroleum) is currently the predominant industry, in dollar terms.

The proportions are affected, particularly in recent years, by the high values per unit output assigned to the mining industry. Not apparent from percentage figures are the substantial increases in physical volume of output of the agricultural, manufacturing, construction or other industries, or the fact that the physical volume of output of the mining (petroleum) industry is beginning to decrease.

The net value of production by the main commodity producing industries of Alberta and Canada in 1979 is as shown. In Alberta, manufacturing accounts for 14 per cent, construction for 25 per cent, and agriculture for 8 per cent, while the mining industry accounts for approximately 52 per cent. Canadian net value of production figures contrast strongly, showing over 50 per cent generated by manufacturing and only about 16 per cent by mining. It is interesting to note that Alberta's net value of mineral production accounts for over one-half of Canada's mining total. Construction is equally important for Canada and Alberta representing in each case over 18 per cent of total net value.

Significant industry shifts have occurred in Alberta during the past forty years. In 1935, agriculture accounted for well over 50 per cent of total net value of production; by 1979 it accounted for less than 10 per cent. The mining industry produced only 11 per cent of the net value in 1935; by 1979 the proportion exceeded 50 per cent. This dramatic change is due to the rapid growth of the petroleum industry since 1947, not to any diminution of agriculture output. Between 1970 and 1979 the mining industry share of value added increased from 37 per cent to 52 per cent, due more to the rise in oil and gas prices than to an increase in production volume.

Over the past ten years the financial contribution of each industry appears to have increased significantly. One must be wary of the year-to-year comparisons, however, because these dollar values include inflationary price increases and thus do not necessarily represent increases in real output.

Table 1.10 **Census Value Added in Goods-Producing Industries - Alberta - Selected Years -1935-1981** (millions of dollars)

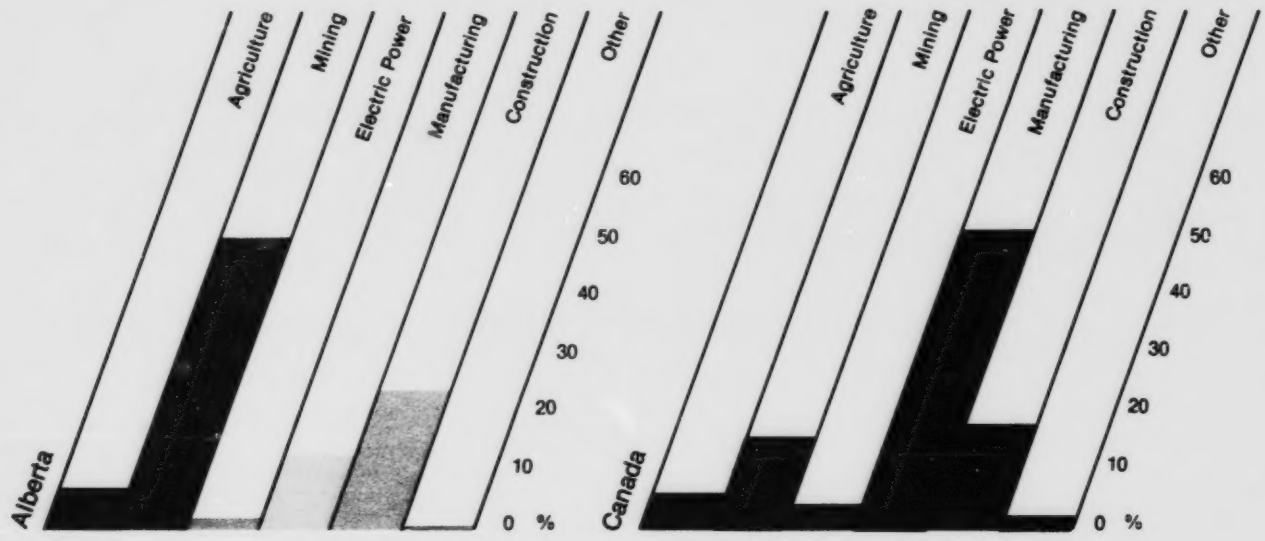
	Agriculture	%	Mining	%	Electric Power	%	Manu-facturing	%	Construction	%	Other*	%	Total	%
1935														
1945														
1955														
1965														
1971														
1976														
1977														
1978														
1979														
1980														
1981														

*Comprises Logging, Fisheries and Trapping.

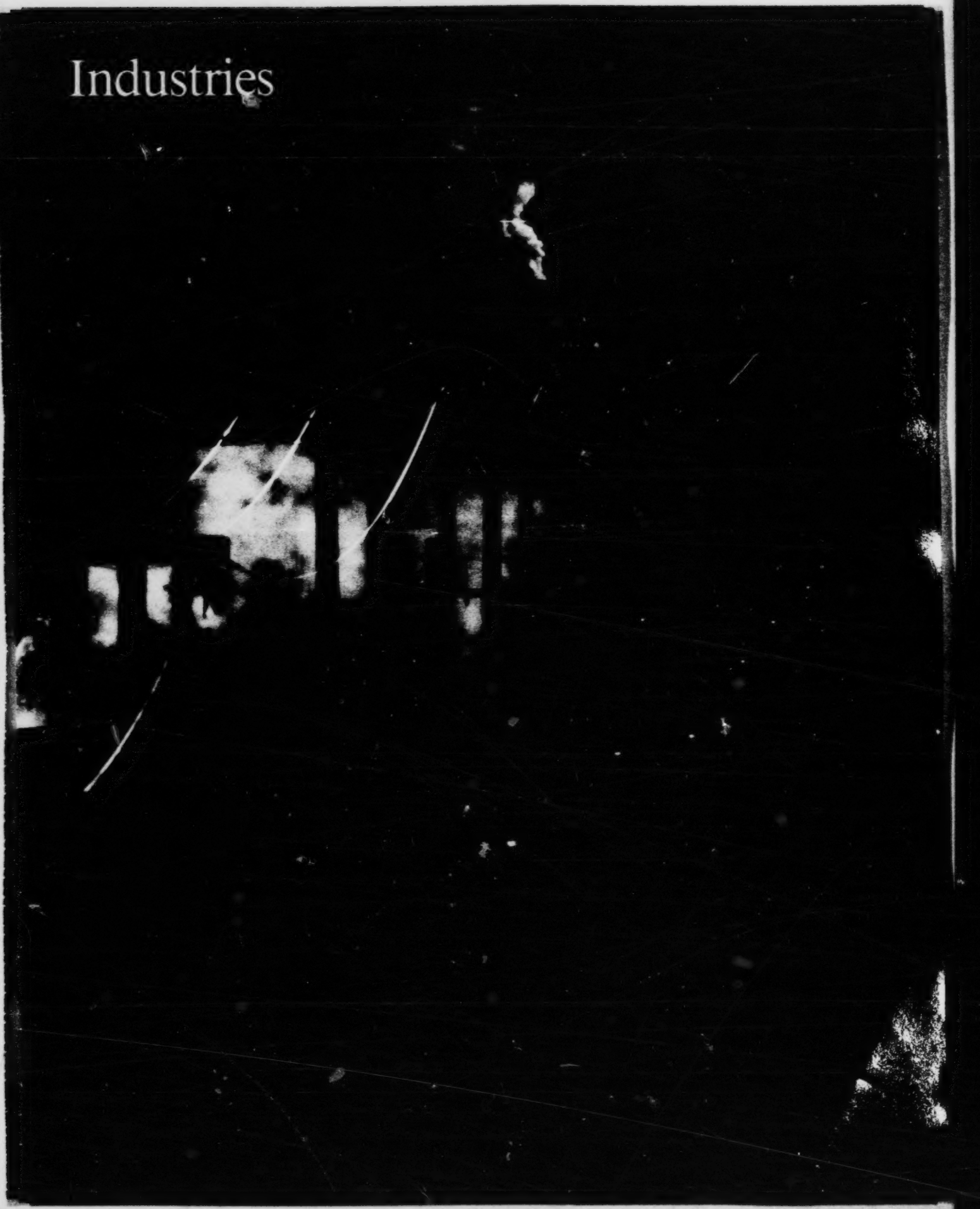
Table 1.11 **Net Value of Production in Commodity Producing Industries - Alberta and Canada - 1979**
(millions of dollars)

	Alberta		Canada	
	$	% of total	$	% of total
Agriculture				
Mining				
Electric Power				
Manufacturing				
Construction				
Other				
Total	**22,236.7**	**100.0**	**123,151.0**	**100.0**

Net Value of Production, Percentage Breakdown by Industry - Alberta and Canada - 1979



Industries



Manufacturing

Manufacturing is an important part of the Alberta economy, currently ranking third in net value of production. Growth of the industry has been remarkable during the last two decades. The 1981 value of shipments was approximately $12.9 billion, a six-fold increase over the 1971 value of $2.1 billion. Even allowing for the inflationary factor, the increase is very substantial. However, the potential is only starting to be realized: manufacturing expansion and diversification are among the important goals of the provincial government.

Key indicators of the significance of manufacturing include the number of persons employed, the variety of finished and semifinished goods produced, the gross value of production in real terms, and the volume of new investment in plant and equipment.

In 1979, the industry provided employment for over 77,000 persons, roughly 8 per cent of the total work force.

The number of producing establishments has virtually remained constant since the 1950's. The typical establishment is now much larger in terms of plant size, employment and output. An increased number of oil refineries, chemical plants, wood based industries, and steel plants manufacture high-value products. Small, inefficient, cottage-type operations are being replaced by larger organizations, often with national or international connections.

Manufacturing volume has risen steadily since the end of World War II. The provincial contribution to total Canadian value rose from 4.1 per cent in 1971 to 6.9 per cent in 1981. The accelerated development in the past decade has been particularly notable in the iron and steel fabrication, the petroleum, and the chemical and chemical products industries. Their evolution in turn has reduced the relative preponderance of the food and beverages industry. Post war increases are attributable to a number of factors including the rapid population and economic growth in western Canada, especially in Alberta and British Columbia, providing a larger and more affluent market; the high volume of construction activity (using regionally manufactured products); the broadening interdependent manufacturing base; the development of manufactured products for export markets (amounting to $3.3 billion in 1981); the rising personal and corporate incomes; and to more intensive processing of raw material resources.

During the past decade these basic trends were enhanced by the rapid rise in energy prices, the accompanying conventional oil and gas industry boom, the large scale projects related to the Athabasca sands oil extraction plants, and the evolving chemical industries. These factors contributed to making Alberta a major centre of economic activity in Canada.

Annual investment in manufacturing plants grew rapidly from a modest $184 million in 1970 to over $1,800 million in 1981. Expenditures on plant and equipment rose steadily in the traditional food and beverages, wood products, metal fabricating, and non-metallic mineral products industries. More significant increases occurred in the chemicals, petroleum refining, transportation equipment, and iron and steel industries.

The range of equipment made for use in the oil and gas industry has broadened. Heavy expenditures were incurred in anticipation of construction of more synthetic and heavy crude oil plants in the Fort McMurray and Cold Lake areas, and of additional world-scale petrochemical installations.

Progress in manufacturing is being achieved despite several traditional disadvantages: the relatively small domestic population of western Canada, the significant distances from major mass markets together with the accompanying high transportation costs to those markets, and the relatively small industrial base.

A number of major economic advantages offset the handicaps: the accelerating population growth in western Canada (it has more than doubled in the post war period); Alberta's individual and corporation taxation rates which are among the lowest in Canada; the transportation infrastructure which is being improved and expanded continually; and an assured and attractive supply of competitively priced hydrocarbon resources.

Western Canada now has a population in excess of seven million persons; that of the western United States is several times larger; and that of the so-called Pacific Rim countries many times larger again. A central location provides a favourable setting for serving all of western Canada and some of the western States. It also offers a relatively favourable base for manufacturing certain products to take advantage of the significant market opportunities which are opening up in the Pacific Rim countries. In fact many firms are successfully exporting to continental and world markets as well as servicing regional needs.

Out-of-country exports of manufactured products in 1981 were valued at over $3 billion. The exports consisted of a broad range of products, including meat, whiskey, lumber, chemicals, fertilizers, refined nickel, oilfield equipment, agricultural machinery, aircraft parts, and prefabricated buildings.

Alberta government representatives are based in London, Tokyo, Hong Kong, Houston, Los Angeles, New York, Ottawa and Toronto. They, along with the services offered by the Economic Development

Department, assist businesses in taking advantage of extra-provincial market opportunities.

Diversification implies the production of additional ranges of semi-processed and finished consumer goods and includes some types of upgrading of raw resources. It may also imply a notable shift in the proportions of product-mix. Both phenomena are evident over the whole post-war period and especially the last decade.

Typical examples of new local production over the longer period include plywood and woodpulp, vegetable oils and frozen foods, oilfield steel pipe and plastic pipe, construction steels and lubricants, textiles and fibre glass, oilfield equipment and agricultural machinery.

More recently the emphasis has been on basic petrochemicals such as vinyl- and poly-vinyl chlorides, vinyl acetate, ethylene dichloride, methanol, chloralkalis, benzene and styrene. Perhaps equally important have been expanded ranges of existing product lines; for example, oil field pumps, chipboards, telephones and cables, and ball valves.

Most apparent have been the changes in the overall products mix. The predominance of the food and beverage industry diminished with the rapid expansion of chemicals manufacturing, petroleum refining and production of the iron and steel goods. The altering emphasis has been related closely to the energy resources and accompanying construction industries' boom. Together they are laying the foundation for further diversification, larger ranges of consumer products, and less dependence on out-of-province sources.

In 1971, only 18 per cent of Alberta's total manufacturing shipments were accounted for by the petroleum resources based industries. By 1981, the volume of shipments reached $4.2 billion - nearly one-third of the total. Petroleum refining has been particularly dynamic with production value reaching $2.8 billion. The related chemical products industry shipments totalled nearly $1.4 billion.

The food and beverage shipment value now ranks second, accounting for less than 27 per cent of the total — down from the 43 per cent share recorded in 1971 — despite a quadrupling in dollar value during the ten year period.

The metal working and transportation equipment industries comprise four separate sub-groups. Their composite dollar volume of shipments increased six-fold, to $2.5 billion over the period, but their portion of the total held steady at close to 20 per cent.

The forestry based industries — which include wood products, paper products, printing, and furniture — increased output to more than $2.5 billion, or more than five-fold, maintaining their proportionate share of total production.

Although manufacturing output increased dramatically during the decade, the contribution of the sector to the total net dollar value of goods production of all industries decreased from 21 per cent to 14 per cent, due solely to the phenomenal increase in the dollar value of mining output.

Decentralization of manufacturing activity is encouraged by government whenever justified by economics and practicality. It is appreciated fully that interdependent manufacturers prefer to be in close proximity in order to minimize transportation costs of parts and materials; and that resource based industries are best sited near their sources of raw materials, and market based industries are best situated as close as possible to their markets.

Decentralization forestalls population and industrial congestion in large urban centres, and helps stimulate development and provide economic security for small centres. At present the Calgary and Edmonton areas account for over 70 per cent of the gross value of manufactured shipments; and Lethbridge, Medicine Hat and Red Deer for another 20 per cent. Smaller centres benefit by providing over 33 per cent of the total manufacturing work force although they account for only 10 per cent of gross production value.

In general, the bulk of production of foods and beverages, and of transportation and electrical equipment, occurs in the area south of Red Deer. North of Red Deer, the emphasis is on refined petroleum products, chemicals, metal fabrication, wood based products and textiles. Other industries such as printing, publishing, and machinery manufacture are fairly evenly distributed.

At this early stage western Canadian mass markets for final consumer products are not yet significant enough for the establishment of large scale plants; generally such secondary activity takes place close to very large population concentrations. A local western Canadian mass market can only develop over time.

Labour-intensive manufacturing activities require large pools of relatively low-cost labour. These have been traditionally supplied by the inflow of surplus workers from farming communities or from large scale immigration. Western Canada has already depleted any excess from the rural areas; in recent years the pool has been supplemented by a large influx of individuals from other provinces and countries. The large-scale projects in the energy-mining and construction industries have exerted upward pressure on wage rates, tending to keep them fairly high.

In addition, the capital-intensive nature of industries involved in resource development and their

potential for high returns have drained the local capital and entrepreneurial pools and thus inhibited extensive development of market-oriented secondary manufacturing.

Nevertheless, the development of the energy-mining sector in the past decade (not to mention the solid prospects for future development) has already induced the broadening of the manufacturing base. The increasing size of regional markets - both in terms of population and of inter-dependent manufacturing complexes -should encourage further expansion.

Provincial government policy is to encourage local processing of resources to obtain maximum employment and investment benefits from their up-grading. The policy takes form in a variety of ways.

Inter-company communication is being promoted by governments and trade organizations. Programs in place acquaint local manufacturers with the materials produced by, or needed by, other local manufacturers. Attention is focused on imported items of sufficient volume to make domestic production possible. Prospective manufacturers have opportunities to produce these and intermediate goods required by other industries. Firms are urged to check local sources for goods and services, rather than assume that they can only be obtained from distant locations.

The government is committed to the promotion of manufacturing activities outside main centres in order to provide local employment, reduce the volume of imports needed, forestall population and traffic congestion, and to even out municipal tax bases.

Corporate and personal taxation rates are among the lowest in Canada. For certain types of industry property taxes are uniform irrespective of location.

Assistance is given in the negotiation of favourable freight rates to other Canadian markets and to points of export. The development of export markets is stimulated by the organization of trade missions and by stationing government representatives in strategic places to identify export markets and firms which might well invest in the province.

On a more tangible level, assistance is given for the provision of adequate road and other transportation facilities necessary for industrial expansion and access.

Provision of data and of general research and development assistance to firms or individuals is supplemented by specific import replacement studies, the results of which are issued regularly, identifying products suitable for local manufacture.

Experimental stations and research councils are assisted generously in the development of new products, and new strains of crops and livestock peculiarly suited to regional conditions.

Technological and trades training institutions are among the best and most extensive in Canada and provide a constant stream of highly skilled and well qualified personnel for the industrial and commercial firms. Other considerations being equal, preference for local scientific, technological, and research expertise is encouraged.

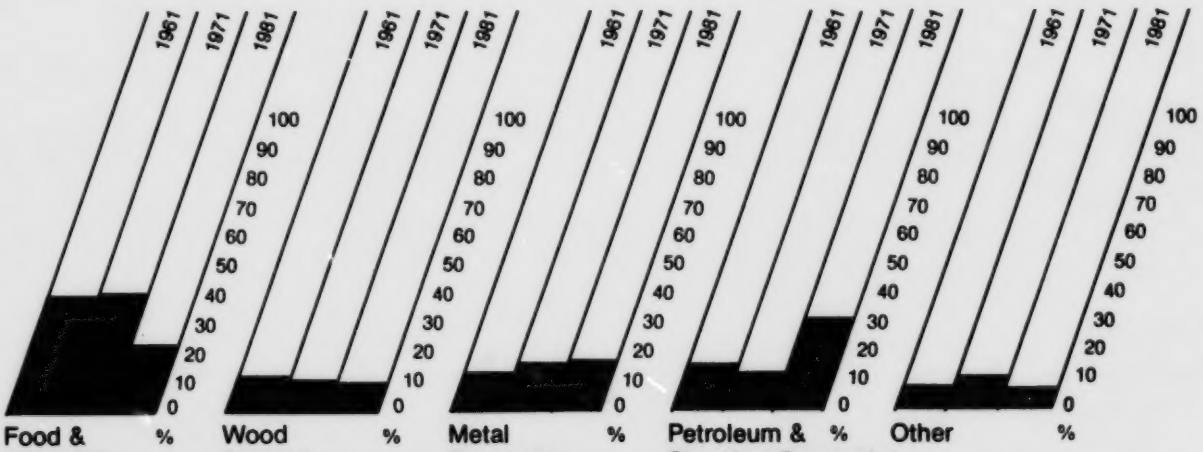
On occasion, and under certain conditions, financial assistance is made available through the Alberta Opportunity Company, the Alberta Agricultural Development Corporation, and most recently through a venture capital foundation.

The cumulative impact of these policies and services is evident in the rapidly expanding industrial base of the province, particularly in recent years.

Table 2.1 **Value of Manufacturers' Factory Shipments, by Industrial Groups - Alberta - Specified Years - 1951-1981** (millions of dollars)

	1951	1961	1971	1976	1977	1978	1979	1980	1981
Food & Beverages								3,073	3,434
Rubber & Plastic Products								N/A	N/A
Leather								N/A	N/A
Textile Products								78	101
Wood								451	576
Furniture & Fixtures								108	143
Paper & Allied Products								327	376
Printing, Publishing & Allied Products								349	450
Primary Metals								626	796
Metal Fabricating								633	791
Machinery								548	667
Transportation Equipment								251	251
Electrical Products								116	143
Non-Metallic Mineral Products								311	394
Petroleum Products								2,106	2,106
Chemical & Chemical Products								1,129	1,129
Miscellaneous Manufacturing								94	126
Total	458	936	2,081	5,216	6,020	7,428	8,947	10,572	12,958

Gross Value of Shipments - Manufacturing Industries - Alberta - 1961, 1971, 1981



Total Manufacturing (millions of dollars)

Table 2.2 Principal Manufacturing Statistics, Selected Centres by Census Division - Alberta - 1979

Census Division & Municipality	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
Census Division 1	56	1,976	311	2,287	40,065	23,690	132,194	146,353	300,198
Census Division 2	126	3,458	947	4,405	68,768	7,406	647,571	190,404	840,900
Lethbridge Co. 26	[redacted]								
Lethbridge	[redacted]								
Coaldale	[redacted]								
Taber	[redacted]								
Vauxhall	[redacted]								
Census Division 3	44	457	87	544	8,115	640	29,812	14,891	45,064
Fort Macleod	[redacted]								
Claresholm	[redacted]								
Census Division 4	5	9	5	14	176	—	196	365	560
Census Division 5	25	384	51	435	8,493	14,332	44,156	53,058	114,089
I.D. No. 7	[redacted]								
Linden	[redacted]								
Census Division 6	753	18,703	4,730	23,433	387,804	27,061	1,491,311	778,977	2,266,337
High River	[redacted]								
Calgary	[redacted]								
Okotoks	[redacted]								
Cochrane	[redacted]								
Airdrie	[redacted]								
Didsbury	[redacted]								
Olds	[redacted]								
Census Division 7	29	107	18	125	1,711	162	7,709	3,320	11,114
Castor	[redacted]								
Stettler	[redacted]								
Census Division 8	106	1,770	423	2,193	33,759	6,705	268,689	68,520	342,162
Innisfail	[redacted]								
Red Deer	[redacted]								
Rocky Mountain House	[redacted]								
Lacombe	[redacted]								
Ponoka	[redacted]								
Census Division 9	25	534	73	607	12,782	5,951	20,476	36,297	61,301
Census Division 10	68	1,493	234	1,727	29,140	3,906	200,230	44,554	243,327
Camrose Co. 22	[redacted]								
Camrose	[redacted]								
Vegreville	[redacted]								
Lloydminster (Alta.)	[redacted]								
Vermilion	[redacted]								

Census Division & Municipality	Establishments	All Employees				Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	Salaries & Wages $ 000	$ 000	$ 000	$ 000	$ 000
Census Division 11	885	24,902	6,288	31,190	545,003	76,007	2,878,115	1,344,687	4,233,213
Wetaskiwin									
Leduc Co. 25									26,899
Leduc									20,569
Drayton Valley									3,352
Parkland Co. 31									2,050
Stony Plain									68,300
Spruce Grove									4,176
Strathcona Co. 20									19,668
Fort Saskatchewan									
Sturgeon M.D. 90									
Edmonton									
St. Albert									
Census Division 12	47	446	106	552	8,491	819	18,923	20,775	39,312
Bonnyville									
St. Paul									
Fort McMurray									
Census Division 13	42	822	131	953	16,126	1,713	31,907	30,252	62,091
Barrhead									
Westlock									
Athabasca									
Census Division 14	17	695	76	771	15,159	4,261	41,528	52,702	96,937
Census Division 15	77	2,344	358	2,702	44,667	8,679	171,069	103,204	283,377
Grande Prairie									
I.D. No. 17									
Peace River									
Total All Census Divisions	2,305	62,170	15,175	77,345	1,321,102	181,332	5,983,886	2,888,358	8,939,982

Table 2.3 Principal Manufacturing Statistics by Industry - Alberta - 1979

Industry Group & Industry	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
Food & Beverage Industries	420	12,140	3,448	15,588	254,514	22,405	2,256,241	560,319	2,824,697
Meat & Poultry Products Industries									
Slaughtering & Meat Processors	68	4,347	842	5,189	87,670	4,682	1,429,247	175,286	1,609,872
Poultry Processors	5	345	555	900	12,833	579	53,918	21,315	74,064
Fruit & Vegetable Processing Industries									
Fruit & Vegetable Canners & Preservers	3	—	—	—	—	—	—	—	—
Frozen Fruit & Vegetable Processors	3	—	—	—	—	—	—	—	—
Dairy Products Industry									
Flour & Breakfast Cereal Products									
Feed Industry									
Bakery Products Industries									
Biscuit Manufacturers	1	—	—	—	—	—	—	—	—
Bakeries	184	1,161	648	1,809	25,995	1,145	34,392	42,433	77,906
Miscellaneous Food Industries									
Confectionery Manufacturers	3	—	—	—	—	—	—	—	—
Cane & Beet Sugar Processors	1	—	—	—	—	—	—	—	—
Vegetable Oil Mills	4	—	—	—	—	—	—	—	—
Miscellaneous Food Processors, N.E.S.	17	576	265	841	12,663	1,605	68,309	52,624	119,578
Beverage Industries									
Soft Drink Manufacturers	15	885	185	1,070	17,175	1,150	29,761	32,205	62,358
Distilleries	3	—	—	—	—	—	—	—	—
Breweries	5	628	99	727	16,018	1,038	21,572	43,895	65,500
Wineries	2	—	—	—	—	—	—	—	—
Rubber & Plastics Products Industries	61	1,230	310	1,540	23,345	1,450	61,921	45,395	106,269
Rubber Products Industries									
Tire & Tube Manufacturers	1	—	—	—	—	—	—	—	—
Miscellaneous Rubber Products Manufacturers	3	—	—	—	—	—	—	—	—
Plastics Fabricating Industry, N.E.S.	57	—	—	—	—	—	—	—	—

	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
Leather Industries	13	—	—	—	—	—	—	—	—
Leather Tanneries									
Shoe Factories									
Leather Glove Factories									
Luggage, Handbag etc. Manufacturers									
Miscellaneous Leather Products Manufacturers	7	—	—	—	—	—	—	—	—
Textile Industries	35	363	392	755	10,573	—	33,572	29,042	62,353
Wool Yarn & Cloth Mills									
Man-Made Fibre, Yarn & Cloth Mills	1	—	—	—	—	—	—	—	—
Fibre & Filament Yarn Manufacturers	1	—	—	—	—	—	—	—	—
Cordage & Twine Industry									
Carpet, Mat & Rug Industry									
Canvas Products, Cotton & Jute Bags									
Cotton & Jute Bags Manufacturers	1	—	—	—	—	—	—	—	—
Canvas Products Manufacturers	9	73	112	185	2,649	52	5,189	5,045	10,298
Miscellaneous Textile Industries									
Embroidery, Pleating & Hemstitching	3	7	17	24	255	—	111	305	416
Textile Dyeing & Finishing Plants	1	—	—	—	—	—	—	—	—
Miscellaneous Textile Industries, N.E.S.	16	—	—	—	—	—	—	—	—
Knitting Mills	2	—	—	—	—	—	—	—	—
Knitting Mills (Except Hosiery Mills)									
Other Knitting Mills	2	—	—	—	—	—	—	—	—
Clothing Industries	33	358	1,616	1,974	24,210	384	30,083	45,154	78,069
Men's Clothing Industries									
Men's Clothing Factories	21	305	1,326	1,631	20,744	342	28,120	39,693	68,436
Men's Clothing Contractors	1	—	—	—	—	—	—	—	—
Women's Clothing Industries									
Women's Clothing Factories	4	—	—	—	—	—	—	—	—
Fur Goods Industry									
Miscellaneous Clothing Industries									
Hat & Cap Industry	1	—	—	—	—	—	—	—	—
Miscellaneous Clothing Industries, N.E.S.	2	—	—	—	—	—	—	—	—

	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
Wood Industries	200	6,125	842	6,967	111,669	—	234,350	210,345	445,880
Sawmills, Planing & Shingle Mills									
Sawmills & Planing Mills	50	2,296	214	2,510	40,958	5,450	74,852	94,900	168,461
Veneer & Plywood Mills									
Sash, Door & Other Millwork Plants									
Sash, Door & Other Millwork, N.E.S.	54	835	109	944	14,772	497	29,841	24,451	54,850
Pre-Fabricated Buildings (Wood Frame)	16	1,548	198	1,746	29,445	401	84,248	38,468	123,608
Manufacturers of Wooden Kitchen Cabinets	42	665	149	814	12,299	300	12,863	20,178	33,236
Wooden Box Factories									
Coffin & Casket Industry									
Miscellaneous Wood Industries									
Wood Preservation Industry	8	193	12	205	3,048	386	8,474	8,122	17,075
Miscellaneous Wood Industries, N.E.S.	16	187	55	242	2,333	55	4,228	3,112	7,403
Furniture & Fixture Industries	139	1,590	554	2,144	28,059	606	40,759	50,142	90,809
Household Furniture Manufacturers									
Furniture Re-Upholstery & Repair	67	275	83	358	3,275	—	4,849	4,040	8,888
Household Furniture Manufacturers, N.E.S.	36	510	235	745	9,203	232	12,506	15,914	28,276
Office Furniture Manufacturers									
Miscellaneous Furniture & Fixture Manufacturers									
Paper & Allied Industries	30	2,174	401	2,575	46,726	10,663	156,488	114,251	282,794
Pulp & Paper Mills									
Asphalt Roofing Manufacturers									
Paper Box & Bag Manufacturers									
Folding Carton & Set-Up Box Manufacturers	1	—	—	—	—	—	—	—	—
Corrugated Box Manufacturers	7	366	78	444	7,412	386	20,264	13,180	34,720
Paper & Plastic Bag Manufacturers	6	222	109	331	4,834	299	13,774	7,988	21,463
Miscellaneous Paper Converters									

	Establishments	All Employees				Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
		Male	Female	Total	Salaries & Wages				
	No.	No.	No.	No.	$ 000	$ 000	$ 000	$ 000	$ 000
Printing, Publishing & Allied Industries	311	4,086	2,321	6,407	100,336	1,455	98,930	198,642	298,301
Commercial Printing								70,417	119,057
Platemaking, Typesetting Etc. Industries								8,276	11,529
Publishing Only								4,763	8,998
Publishing & Printing								115,186	158,716
Primary Metal Industries	26	3,690	247	3,937	77,453	11,908	301,273	214,188	512,816
Iron & Steel Mills									
Steel Pipe & Tube Mills								47,624	156,615
Iron Foundries								24,294	38,406
Smelting & Refining									
Aluminum Rolling, Casting & Extruding									
Metal Rolling, Casting Etc., N.E.S.									6,728
Metal Fabricating Industries	335	8,264	1,051	9,315	167,198	4,682	291,670	289,831	575,402
Boiler & Plate Works									50,235
Fabricated Structural Metal Industry									129,985
Ornamental & Architectural Metal Industry									109,688
Metal Door & Window Manufacturers	33	930	316	1,246	16,621	588	44,623	35,006	79,713
Ornament & Architect Metal, N.E.S.	38	475	70	545	8,861	196	15,952	14,008	29,975
Metal Stamping, Pressing & Coating								59,145	134,517
Metal Coating Industry	12	191	18	209	3,779	207	1,980	7,174	9,301
Metal Stamping & Pressing Industry	52	1,177	143	1,320	22,093	502	81,377	45,971	125,216
Wire & Wire Products Manufacturers									26,711
Hardware, Tool & Cutlery Manufacturers									5,905
Heating Equipment Manufacturers									15,371
Machine Shops									65,778
Miscellaneous Metal Industries									32,212

	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
Machinery Industries	134	5,037	479	5,516	96,726	—	150,773	166,766	314,998
Agricultural Implement Industry									
Miscellaneous Machinery Equipment Manufacturers									
Commercial Refrigerator & Air Conditioner Manufacturers									
Office & Store Machinery Manufacturers									
Transportation Equipment Industries	82	2,859	482	3,341	55,831	1,251	96,854	73,242	167,010
Aircraft & Aircraft Parts Manufacturers									
Motor Vehicle Manufacturers									
Truck Body & Trailer Manufacturers									
Truck Body Manufacturers	14	507	41	548	8,856	189	11,816	13,754	25,639
Non-Commercial Trailer Manufacturers	29	973	235	1,208	18,318	448	64,018	30,012	92,859
Commercial Trailer Manufacturers	9	—	—	—	—	—	—	—	—
Motor Vehicle Parts & Accessories									
Boatbuilding & Repair									
Miscellaneous Vehicle Manufacturers									
Electrical Products Industries	43	1,392	692	2,084	33,106	723	50,302	40,005	86,527
Manufacturers of Small Electrical Appliances									
Manufacturers of Major Appliances									
Manufacturers of Lighting Fixtures									
Manufacturers of Household Radio & T.V.									
Communications Equipment Manufacturers									
Manufacturers of Electrical Industrial Equipment									
Manufacturers of Electric Wire & Cable	2	—	—	—	—	—	—	—	—
Manufacturers of Miscellaneous Electrical Products									
Battery Manufacturers	2	—	—	—	—	—	—	—	—
Manufacturers of Miscellaneous Electrical Products N.E.S.									

	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
Non-Metallic Mineral Products Industries	161	5,460	652	6,112	117,112	23,257	244,530	286,253	549,513
Clay Products Manufacturers	[redacted]								
Clay Products Manufacturers (Domestic Clay)	10	—	—	—	—	—	—	—	—
Clay Products Manufacturers (Imported Clay)	4	—	—	—	—	—	—	—	—
Cement Manufacturers	[redacted]								
Stone Products Manufacturers	[redacted]								
Concrete Products Manufacturers	[redacted]								
Concrete Pipe Manufacturers	6	383	33	416	8,172	554	15,850	18,938	35,556
Manufacturers of Structural Concrete Products	8	720	26	746	14,070	560	19,898	32,023	52,292
Concrete Products Manufacturers N.E.S.	30	429	35	464	8,193	838	14,949	14,549	30,127
Ready-Mix Concrete Manufacturers	[redacted]								
Glass & Glass Products Manufacturers	[redacted]								
Glass Manufacturers	1	—	—	—	—	—	—	—	—
Glass Products Manufacturers	11	29	15	44	563	—	1,019	869	1,994
Lime Manufacturers	[redacted]								
Miscellaneous Non-Metallic Mineral Products	[redacted]								
Miscellaneous Non-Metallic Mineral, N.E.S.	13	948	130	1,078	19,530	3,960	42,102	58,996	105,379
Petroleum & Coal Products Industries	15	1,598	421	2,019	47,827	23,013	1,538,578	154,488	1,700,610
Petroleum Refineries	[redacted]								
Petroleum Refining	6	1,448	391	1,839	44,708	22,366	1,515,167	145,749	1,688,377
Manufacturers of Lubricating Oils & Greases	3	—	—	—	—	—	—	—	—
Miscellaneous Petroleum & Coal Products Industries	[redacted]								
Chemical & Chemical Products Industries	71	4,020	496	4,516	92,067	67,543	349,084	368,403	755,197
Manufacturers of Plastics & Synthetic Resins	[redacted]								
Manufacturers of Pharmaceuticals & Medicines	[redacted]								—
Paint & Varnish Manufacturers	[redacted]								—
Manufacturers of Soaps & Cleaning Compounds	[redacted]								5,673
Manufacturers of Industrial Chemicals	[redacted]								612,258

	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
Manufacturers of Pigments & Dry Colours	1	—	—	—	—	—	—	—	—
Industrial Chemicals (Inorganic) N.E.S.	13	1,651	154	1,805	38,166	46,715	168,112	157,198	370,328
Industrial Chemicals (Organic) N.E.S.	8	—	—	—	—	—	—	—	—
Miscellaneous Chemical Industries	[redacted]								
Manufacturers of Printing Inks	4	—	—	—	—	—	—	—	—
Miscellaneous Chemical Industries, N.E.S.	26	370	70	440	8,293	1,187	37,250	28,617	67,088
Miscellaneous Manufacturing Industries	194	1,580	616	2,196	29,524	235	30,500	34,418	63,744
Scientific & Professional Equipment	[redacted]								
Instrument & Related Products Manufacturers	17	304	98	402	6,771	34	5,989	5,236	10,280
Orthopaedic & Surgical Appliances	4	11	7	18	182	—	272	260	533
Ophthalmic Goods Manufacturers	17	169	116	285	3,419	26	5,707	4,336	9,968
Dental Laboratories	44	392	121	513	5,810	—	4,541	7,409	11,950
Jewellery & Silverware Industry	[redacted]								
Sporting Goods & Toy Industries	[redacted]								
Sporting Goods Manufacturers	9	48	15	63	803	—	1,848	1,687	3,243
Toys & Games Manufacturers	2	—	—	—	—	—	—	—	—
Signs & Displays Industry	[redacted]								
Miscellaneous Manufacture Industries, N.E.S.	[redacted]								
Broom, Brush & Mop Manufacturers	3	—	—	—	—	—	—	—	—
Sound Recording — Musical Instruments	—	27	20	47	743	—	—	—	—
Pen & Pencil Manufacturers	1	—	—	—	—	—	—	—	—
Other Miscellaneous Manufacturing Industries	28	166	84	250	2,848	25	4,890	5,708	10,527
Total All Industries	2,305	62,170	15,175	77,345	1,321,102	181,332	5,983,886	2,888,358	8,939,982

Table 2.4 Principal Manufacturing Statistics by Industry - Census Divisions - Alberta - 1979

Census Division & Industry	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
		Male	Female	Total					
	No.	No.	No.	No.	$ 000	$ 000	$ 000	$ 000	$ 000
CD 1									
Food & Beverage Industries									42,662
Rubber & Plastics Products Industries									
Wood Industries									
Furniture & Fixture Industries									
Printing, Publishing & Allied Industries									
Metal Fabricating Industries									
Machinery Industries									
Transportation Equipment Industries									
Non-Metallic Mineral Products Industries									
Chemical & Chemical Products Industries									
Miscellaneous Manufacturing Industries									
Total All Industries	56	1,976	311	2,287	40,065	23,690	132,194	146,353	300,198
CD 2									
Food & Beverage Industries									
Rubber & Plastics Products Industries									
Textile Industries									
Wood Industries									
Furniture & Fixture Industries									
Paper & Allied Industries									
Printing, Publishing & Allied Industries									
Primary Metal Industries									
Metal Fabricating Industries									
Machinery Industries									
Transportation Equipment Industries									
Electrical Products Industries									
Non-Metallic Mineral Products Industries									21
Miscellaneous Manufacturing Industries									784
Total All Industries	126	3,458	947	4,405	68,768	7,406	647,571	190,404	840,900

	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
CD 3									
Food & Beverage Industries									
Leather Industries									
Clothing Industries									
Wood Industries									
Printing, Publishing & Allied Industries									
Metal Fabricating Industries									
Machinery Industries									
Transportation Equipment Industries									
Electrical Products Industries									
Total All Industries	44	457	87	544	8,115	640	29,812	14,891	45,064
CD 4									
Printing, Publishing & Allied Industries									
Metal Fabricating Industries									
Transportation Equipment Industries									
Total All Industries	5	9	5	14	176	—	196	365	560
CD 5									
Food & Beverage Industries									
Textile Industries									
Wood Industries									
Furniture & Fixture Industries									
Printing, Publishing & Allied Industries									
Metal Fabricating Industries									
Machinery Industries									
Transportation Equipment Industries									
Non-Metallic Mineral Products Industries									
Chemical & Chemical Products Industries									
Total All Industries	25	384	51	435	8,493	14,332	44,156	53,058	114,089
CD 6									
Food & Beverage Industries									
Rubber & Plastics Products Industries									
Leather Industries									
Textile Industries									
Knitting Mills									
Clothing Industries									
Wood Industries									
Furniture & Fixture Industries									

	Establishments	All Employees				Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
		Male	Female	Total	Salaries & Wages				
	No.	No.	No.	No.	$ 000	$ 000	$ 000	$ 000	$ 000
Paper & Allied Industries									
Printing, Publishing & Allied Industries									
Primary Metal Industries									
Metal Fabricating Industries									2,014
Machinery Industries									
Transportation Equipment Industries									
Electrical Products Industries									
Non-Metallic Mineral Products Industries									
Petroleum & Coal Products Industries									
Chemical & Chemical Products Industries									
Miscellaneous Manufacturing Industries									
Total All Industries	753	18,703	4,730	23,433	387,804	27,061	1,491,311	778,977	2,266,337
CD 7									
Food & Beverage Industries									
Wood Industries									
Furniture & Fixture Industries									
Printing, Publishing & Allied Industries									
Metal Fabricating Industries									
Machinery Industries									
Transportation Equipment Industries									
Non-Metallic Mineral Industries									
Total All Industries	29	107	18	125	1,711	162	7,709	3,320	11,114
CD 8									
Food & Beverage Industries									
Rubber & Plastics Products Industries									
Leather Industries									
Textile Industries									
Clothing Industries									
Wood Industries									1,561
Furniture & Fixture Industries									3,181
Printing, Publishing & Allied Industries									9,528
Metal Fabricating Industries									19,760
Machinery Industries									6,378
Transportation Equipment Industries									
Electrical Products Industries									

	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
Non-Metallic Mineral Products Industries									
Petroleum & Coal Products Industries									
Chemical & Chemical Products Industries									
Miscellaneous Manufacturing Industries									
Total All Industries	106	1,770	423	2,193	33,759	6,705	268,689	68,520	342,162
CD 9									
Food & Beverage Industries									
Clothing Industries									
Wood Industries									
Furniture & Fixture Industries									
Printing, Publishing & Allied Industries									
Metal Fabricating Industries									
Electrical Products Industries									
Non-Metallic Mineral Products Industries									
Chemical & Chemical Products Industries									
Miscellaneous Manufacturing Industries									
Total All Industries	25	534	73	607	12,782	5,951	20,476	36,297	61,301
CD 10									
Food & Beverage Industries									
Rubber & Plastics Products Industries									
Textile Industries									
Wood Industries									
Furniture & Fixture Industries									
Paper & Allied Industries									
Printing, Publishing & Allied Industries									
Primary Metal Industries									
Metal Fabricating Industries									
Machinery Industries									
Non-Metallic Mineral Products Industries									
Petroleum & Coal Products Industries									
Chemical & Chemical Products Industries									
Miscellaneous Industries									
Total All Industries	68	1,493	234	1,727	29,140	3,906	200,230	44,554	243,327

	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
CD 11									
Food & Beverage Industries									729,233
Rubber & Plastics Products Industries									—
Leather Industries									—
Textile Industries									32,661
Knitting Mills									—
Clothing Industries									
Wood Industries									
Furniture & Fixture Industries									
Paper & Allied Industries									
Printing, Publishing & Allied Industries									
Primary Metal Industries									
Metal Fabricating Industries									
Machinery Industries									
Transportation Equipment Industries									
Electrical Products Industries									
Non-Metallic Mineral Products Industries									
Petroleum & Coal Products Industries									
Chemical & Chemical Products Industries									
Miscellaneous Manufacturing Industries									
Total All Industries	885	24,902	6,288	31,190	545,603	76,007	2,878,115	1,344,687	4,233,213
CD 12									
Food & Beverage Industries									
Clothing Industries									
Wood Industries									
Furniture & Fixture Industries									
Printing, Publishing & Allied Industries									
Metal Fabricating Industries									
Machinery Industries									
Transportation Equipment Industries									
Non-Metallic Mineral Products Industries									
Chemical & Chemical Products Industries									
Miscellaneous Manufacturing Industries									
Total All Industries	47	446	106	552	8,491	819	18,923	20,775	39,312

	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
CD 13									
Food & Beverage Industries									
Rubber & Plastics Products Industries									
Wood Industries									
Furniture & Fixture Industries									
Printing, Publishing & Allied Industries									
Primary Metal Industries									
Metal Fabricating Industries									
Transportation Equipment Industries									
Non-Metallic Mineral Products Industries									
Miscellaneous Manufacturing Industries									
Total All Industries	42	822	131	953	16,126	1,713	31,907	30,252	62,091
CD 14									
Food & Beverage Industries									
Wood Industries									
Paper & Allied Industries									
Printing, Publishing & Allied Industries									
Non-Metallic Mineral Products Industries									
Chemical & Chemical Products Industries									
Total All Industries	17	695	76	771	15,159	4,261	41,528	52,702	96,937
CD 15									
Food & Beverage Industries									
Wood Industries									
Furniture & Fixture Industries									
Paper & Allied Industries									
Printing, Publishing & Allied Industries									
Metal Fabricating Industries									
Machinery Industries									
Transportation Equipment Industries									
Non-Metallic Mineral Products Industries									
Chemical & Chemical Products Industries									
Miscellaneous Manufacturing Industries									
Total All Industries	77	2,344	358	2,702	44,667	8,679	171,069	103,204	283,377

Table 2.5 Principal Manufacturing Statistics by Industry - Calgary, Alberta - 1979

Industry Group & Industry	Establishments	All Employees				Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
		Male	Female	Total	Salaries & Wages				
	No.	No.	No.	No.	$ 000	$ 000	$ 000	$ 000	$ 000
Food & Beverage Industries									
Rubber & Plastic Products Industries									
Leather Industries									
Textile Industries									
Knitting Mills									
Clothing Industries									
Wood Industries									
Furniture & Fixture Industries									
Paper & Allied Industries									
Printing, Publishing & Allied Industries									
Primary Metal Industries									
Metal Fabricating Industries									
Machinery Industries									
Transportation Equipment Industries									
Electrical Products Industries									
Non-Metallic Mineral Products Industries									
Petroleum & Coal Products Industries									
Chemical & Chemical Products Industries									
Miscellaneous Manufacturing Industries									
Total All Industries	**693**	**18,044**	**4,566**	**22,610**	**375,676**	**26,175**	**1,466,597**	**752,060**	**2,214,107**

Table 2.6 Principal Manufacturing Statistics by Industry - Edmonton (Metro), Alberta - 1979

Industry Group & Industry	Establishments	All Employees				Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
		Male	Female	Total	Salaries & Wages				
	No.	No.	No.	No.	$ 000	$ 000	$ 000	$ 000	$ 000
Food & Beverage Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rubber & Plastics Products Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Leather Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Textile Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Knitting Mills	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Clothing Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wood Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Furniture & Fixture Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Paper & Allied Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Printing, Publishing & Allied Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Primary Metal Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Metal Fabricating Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Machinery Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Transportation Equipment Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Electrical Products Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Non-Metallic Mineral Products Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Petroleum & Coal Products Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Chemical & Chemical Products Industries	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total All Industries	**797**	**23,674**	**5,999**	**29,673**	**520,702**	**68,956**	**2,796,202**	**1,280,946**	**4,083,819**

Edmonton Metro includes Fort Saskatchewan, St. Albert, Morinville, Gibbons, Bon Accord, Legal, Strathcona County No. 20 and Sturgeon M.D. 90

Table 2.7 Principal Manufacturing Statistics by Industry - Lethbridge, Alberta - 1979

Industry Group & Industry	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
Food & Beverage Industries	[redacted]								
Textile Industries									—
Wood Industries									—
Furniture & Fixture Industries									484
Printing, Publishing & Allied Industries									[redacted]
Primary Metal Industries									—
Metal Fabricating Industries									[redacted]
Machinery Industries									—
Transportation Equipment Industries									—
Electrical Products Industries									—
Non-Metallic Mineral Products Industries									—
Miscellaneous Manufacturing Industries									—
Total All Industries	**78**	**2,310**	**757**	**3,067**	**48,521**	**4,276**	**507,663**	**125,767**	**629,674**

Table 2.8 Principal Manufacturing Statistics by Industry - Medicine Hat and Area - 1979

Industry Group & Industry	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
Food & Beverage Industries									
Rubber & Plastics Products Industries									
Wood Industries									
Furniture & Fixture Industries									
Printing, Publishing & Allied Industries									
Metal Fabricating Industries									
Machinery Industries									
Transportation Equipment Industries									
Non-Metallic Mineral Products Industries									
Chemical & Chemical Products Industries									
Miscellaneous Manufacturing Industries									
Total All Industries	53	1,965	309	2,274	39,923	23,690	132,017	146,149	299,817

Table 2.9 Principal Manufacturing Statistics by Industry - Red Deer, Alberta - 1979

Industry Group & Industry	Establishments	All Employees			Salaries & Wages	Cost of Fuel & Electricity	Cost of Materials & Supplies Used	Value Added	Value of Shipments of Goods of Own Mfr.
	No.	Male No.	Female No.	Total No.	$ 000	$ 000	$ 000	$ 000	$ 000
Food & Beverage Industries									
Leather Industries									
Wood Industries									
Furniture & Fixture Industries									
Printing, Publishing & Allied Industries									
Metal Fabricating Industries									
Machinery Industries									
Transportation Equipment Industries									
Electrical Products Industries									
Non-Metallic Mineral Products Industries									
Miscellaneous Manufacturing Industries									
Total All Industries	49	997	259	1,256	19,864	1,035	197,036	37,484	234,095

Table 2.10 Annual Investment in Manufacturing, by Industrial Group - Alberta - 1950-1982

(millions of dollars)

	Food & Beverages	Iron & Steel Products	Wood	Transport-ation Equipment	Metal Fabricating	Non-metallic Mineral Products	Petroleum Products	Other	Total
1950								9.5	24.4
1951								21.6	45.1
1952								28.2	86.4
1953								79.0	104.1
1954								24.9	64.0
1955								26.5	78.0
1956								91.0	166.8
1957								85.3	111.0
1958								73.4	141.4
1959								29.5	145.8
1960								88.7	98.0
1961									
1962									
1963									
1964									
1965									
1966									
1967									
1968									
1969									
1970									
1971									
1972									
1973									
1974									
1975									
1976									
1977									
1978									
1979									
1980									
1981									
1982									

*Figures confidential, included in "other".

Agriculture

Agricultural land is one of Alberta's great natural resources. Nearly 20 million hectares are used in crop and livestock production with approximately 11 million hectares classified as cultivated. In addition, it is estimated another 9 million hectares could be brought under cultivation and added to the present farmland inventory. Many thousands of acres of this land have been made fertile through the establishment of irrigation districts. More are being added annually as the areas under irrigation spread.

With such prime agricultural land, Alberta has developed one of the most productive agricultural economies in the world. Alberta produces 20 per cent of the total Canadian agricultural output with approximately 8 per cent of the country's population. In view of Alberta's small population and food consumption, export marketing of agricultural products is of prime importance. Present and potential markets are constantly being scrutinized by marketing specialists.

The trend is to larger, more viable farms through consolidation of existing operations. Twenty years ago the average farm size was 223 hectares; at present it is about 350 hectares. The increase in farm size and the steady upward trend in farm input costs have forced farmers to be more efficient, reducing unit production cost and thus competing favourably in present markets. Total farm capital in 1981 was estimated at $36 billion, representing an average investment per farm of $630,000.

World demand for an ever-increasing variety of agricultural commodities is being met by Alberta farmers who diversify their production, add new crops or alter existing ones by changing varieties. For example, while canola was virtually unknown to Alberta farmers 20 years ago, today canola production exceeds a million tonnes annually.

Most of the cultivated area in Alberta is seeded to wheat, barley, tame hay, canola, oats, mixed grains, rye and flaxseed in that order. Receipts from the sale of wheat, oats, barley, canola and flaxseed account for over 90 per cent of the total farm cash receipts from crops; wheat sales consistently predominate in value. The lower cash receipts from barley reflect the relatively large volume of barley fed to livestock.

Specialty crops, which include dehydrated alfalfa, sugar beets, mustard seed, dry beans, vegetables, potatoes, forage seed, and honey are becoming more promising. Producers of specialty crops are relatively few in number and usually have acquired expertise in growing and marketing. Irrigated areas in southern Alberta are among the leading districts of specialty crop production and, as irrigation continues to expand, undoubtedly so will the production of these crops. High summer temperatures and a long growing season make possible the production of many crops that cannot be grown successfully in central and northern areas.

Ample soils of suitable textures are available for growing vegetables in increasing variety and volume, filling local demand for consumption and canning. Progress has been made in solving problems associated with cooling, processing,, grading, packaging and storage, extending the period during which quality can be maintained. Varieties of green peppers and tomatoes, suited to the climatic conditions, have been developed and are appearing throughout local markets. Locally grown carrots, turnips, and potatoes are now marketed most of the year. Nevertheless, the vegetable industry has to contend with stiff competition from American producers. Vegetable production is very seasonal. Storage, because of the colder climate, is also more expensive. Although self-sufficiency is an objective, the regional population is not large enough to support a large industry. The trend elsewhere has been toward more vertical integration in which producers add processing and packaging to their operations and this is likely to be paralleled in Alberta.

The use of fertilizer has increased substantially over the past 25 years. Initial acceptance of fertilizer occurred during the early 1950's when annual use was in the 27,000 - 36,000 tonne range. Fertilizer sales soared to an annual use of over 800,000 tonnes but volume usage is affected by the changes in the grain market. There is a trend toward more convenience and efficiency through the use of bulk fertilizer.

Alberta is a net importer of herbicides and insecticides. The broadleaf herbicide 2,4-D and a drill box treatment for cereal grains are being produced locally. The use of chemicals has increased but, as with fertilizers, sales are affected by the buoyancy of the grain market.

A major portion of the increased capital involved in agriculture continues to be directed towards increasing livestock production. Alberta maintains the largest livestock population of the western provinces, accounting for 51 per cent of the cattle and calves, 41 per cent of the hogs and nearly 58 per cent of the sheep and lambs. The expansion of cattle feeding and slaughtering facilities and improved refrigerated transportation equipment have resulted in an increase in the proportion of livestock locally processed.

During the past 25 years there have been three major "cattle cycles". The last two have had a considerable effect on farming communities. After each contraction-expansion phase, herd inventories have been higher than when the cycle started. Twenty-five years ago Alberta's annual slaughtering totalled slightly more than 250,000 head of cattle and

calves; current cattle slaughterings exceed 1.2 million head. Most of the beef cattle are raised on mixed farms in central and northern Alberta. Of the 58,000 farms in the province, 40,000 have cattle. For many mixed farmers, cattle are a complementary enterprise with animals pasturing on the land that cannot be cropped. Hay and pastures are part of crop rotations; not only do they provide feed for livestock, they build up the soil.

The hog industry has changed over the years. Hog slaughterings increased from just over 600,000 in 1951 to just under 2 million in 1971; since then, production has dropped substantially. There are now only about 10,000 farmers raising hogs as compared with 41,000 in the early 1960's. The average annual farm production is 126 animals; 15 years ago the corresponding figure was 39. Some 76 per cent of all hogs produced come from 1,200 farms. Hog raising is complementary to grain growing as the animals can be used as an alternative marketing channel for surplus or overly cheap feed grains and wheat.

Sheep production is also becoming increasingly concentrated; fewer producers market the majority of sheep and lambs for slaughter.

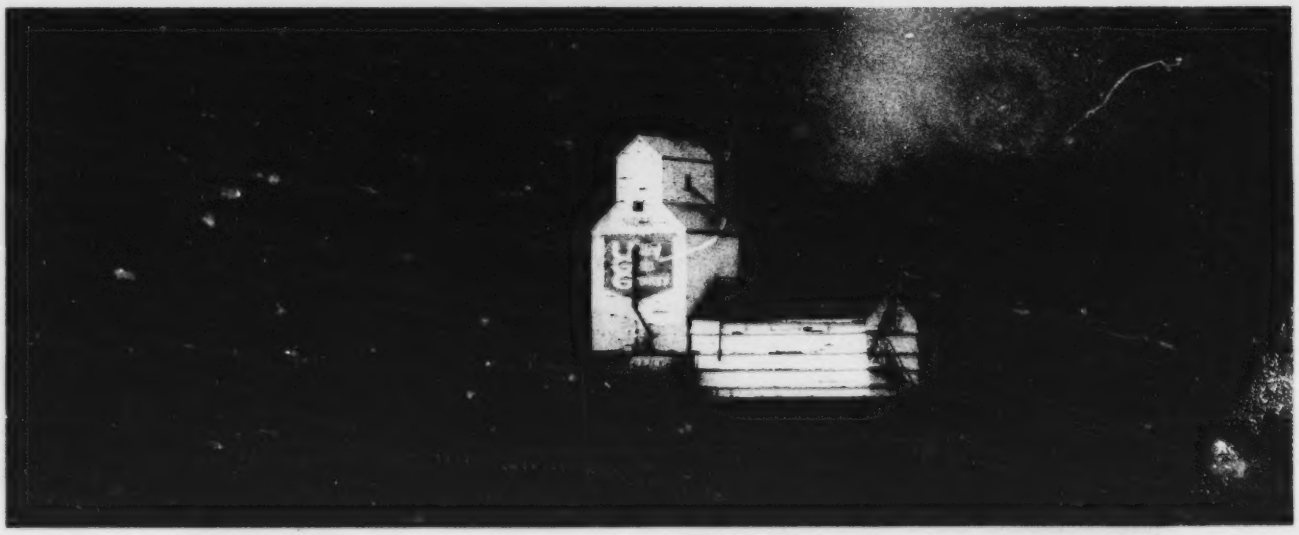
Over the last 15 years, there have been substantial changes in the total amount of cash income Alberta farmers have received. Annual farm cash receipts have increased from approximately $600 million in the early sixties to nearly $4 billion. Incomes, as well as expenses, have fluctuated considerably. Receipts from crops now approach those from livestock, a reflection of higher grain prices of recent years. Farm cash receipts represent only one part of total farm income. In addition to the cash returns from the sale of agricultural products, many farmers supplement their income from non-farm sources in the forms of wages, salaries and business and investment incomes. It is estimated that, during recent years, the non-farm income portion of total farm income has exceeded $400 million annually.

Farmers and ranchers are generally thought of as producers rather than consumers, yet each year they spend in excess of $3 billion on goods and services to maintain agricultural production. Total expenses have more than tripled over the past 10 years.

Alberta producers pay over $2.5 billion annually for physical inputs into crop and livestock production. Expenses average over $40 million on property taxes, $160 million on farm rent, $64 million on electricity and telephones and $150 million for farm labour. Interest costs now exceed $500 million to service debt on farm equipment and buildings, mortgages on land and on other credit purchases. Alberta farmers' annual use of gasoline exceeds 455 million litres and of diesel fuel, 275 million litres.

Increased farm incomes during the past five years have provided producers with the financial resources needed to replace and upgrade farm machinery and equipment. Total wholesale value of new equipment and repairs sold during the past five years exceeded $3.0 billion, over three times the amount for the preceding five years.

Agriculture is dynamic and expected to remain so. A willingness to innovate and a commitment to re-investment continues to enhance one of Alberta's strongest industries.



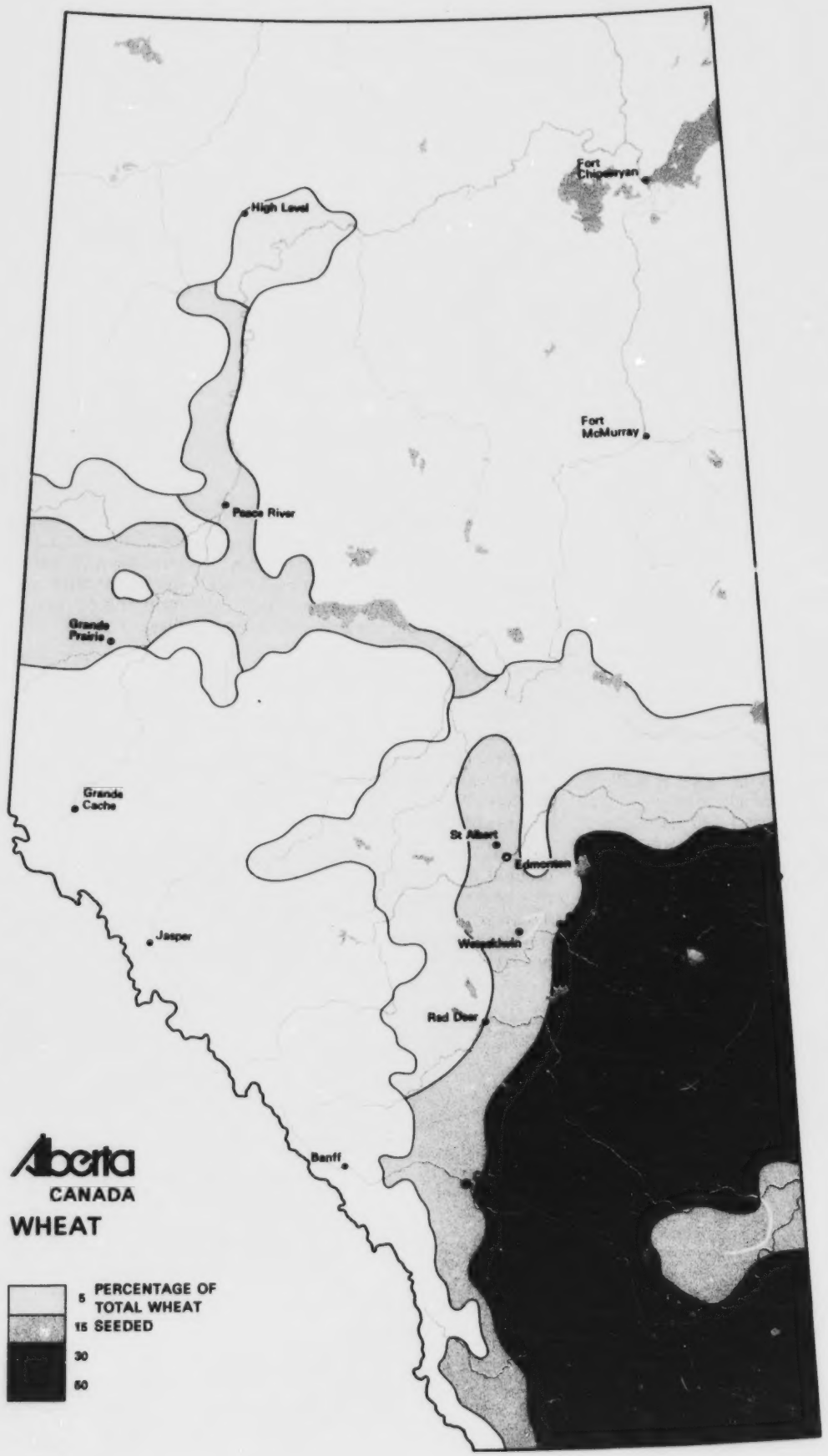

Fort Chipewyan
High Level
Fort McMurray
Peace River
Grande Prairie
Grande Cache
St Albert
Edmonton
Jasper
Wetaskiwin
Red Deer
Banff
Alberta
CANADA
WHEAT
5
15
30
60
PERCENTAGE OF TOTAL WHEAT SEEDED

Table 2.11 Farm Cash Receipts from Farm Operations - Alberta - 1971-1981 (millions of dollars)

	1971	1976	1977	1978	1979	1980	1981
Wheat							
Wheat, C.W.B. Payments (1)							
Oats							25.6
Oats, C.W.B. Payments (1)							—
Barley							417.3
Barley, C.W.B. Payments (1)							48.8
Western Grain Stabilization Payments							—
C.W.B. Cash Advances							
C.W.B. Cash Advance Repayments							
Deferred Grain Receipts							
Liquidation Deferred Grain Receipts							
Crop Insurance Payments							
Rye							
Flaxseed							
Canola							
Sugar Beets							
Potatoes							
Vegetables							
Floriculture & Nursery							
Other Crops							
Total Crops	318.2	916.6	925.5	954.1	1,207.6	1,458.2	2,106.3
Cattle							
Calves							
Hogs							
Sheep & Lambs							
Dairy Products							
Poultry							
Eggs							
Other Livestock & Products							
Total Livestock & Products	463.3	920.8	988.8	1,302.1	1,599.4	1,657.6	1,704.7
Forest & Maple Products							
Dairy Supplementary Payments							
Deficiency Payments (2)							
Provincial Income Stabilization Programme							
Cash Receipts From Farming Operations							
Supplementary Payments (3)							
Total Cash Receipts	795.0	1,858.6	1,989.2	2,286.9	2,823.5	3,148.2	3,876.3

(1) Represents participation payments made by the Canadian Wheat Board direct to producers on crops delivered in previous years.
(2) Payments made under the provisions of the Agricultural Stabilization Act.
(3) Payments made under the provisions of the Prairie Farms Assistance Act and Lower Inventory for Tomorrow (LIFT) program.

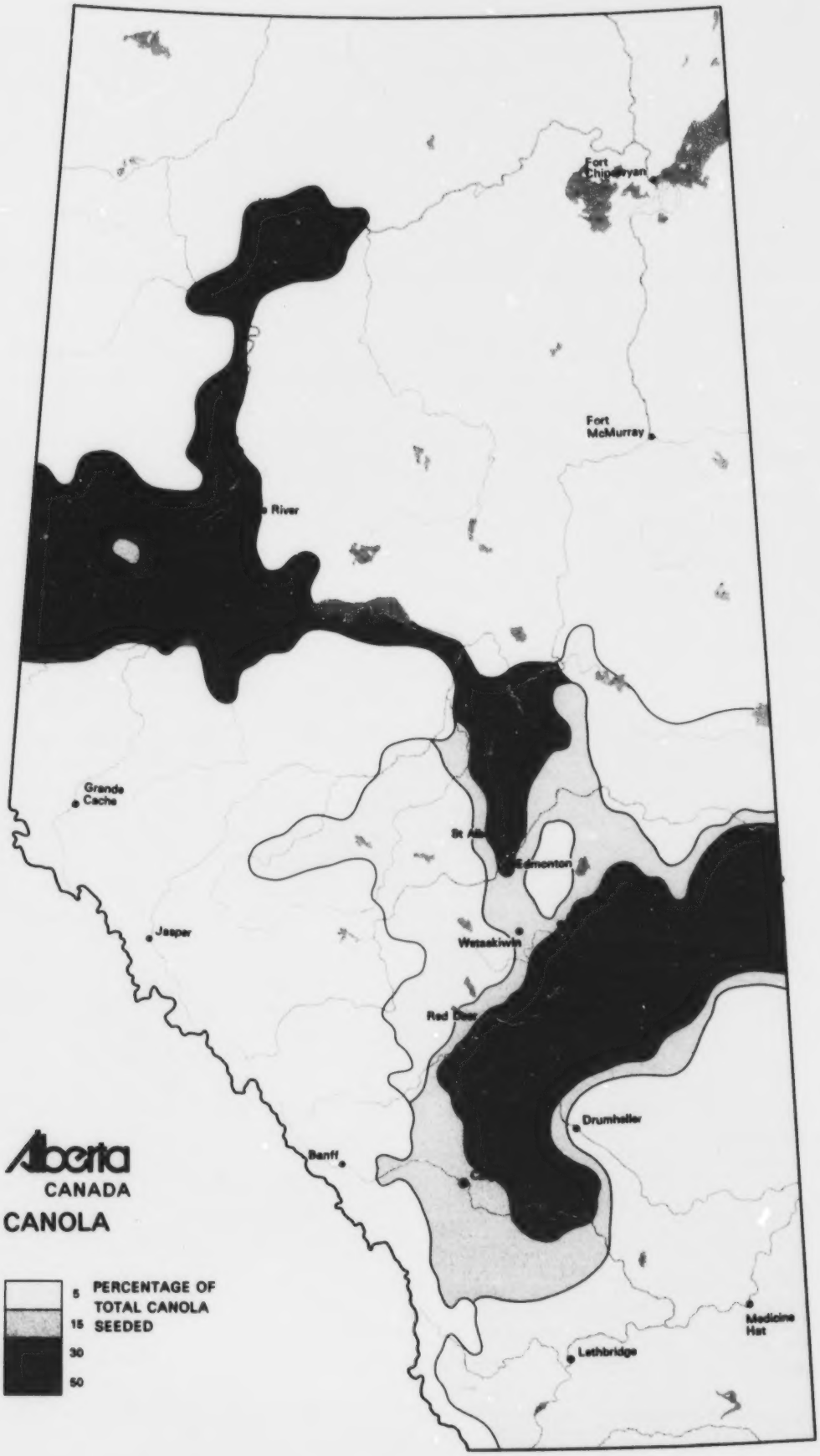

Fort Chipewyan
Fort McMurray
River
Grande Cache
St Albert
Edmonton
Jasper
Wetaskiwin
Red Deer
Drumheller
Banff
Medicine Hat
Lethbridge
Alberta
CANADA
CANOLA
5
15
30
50
PERCENTAGE OF TOTAL CANOLA SEEDED

Table 2.12 Income of Farm Operators from Farming Operations - Alberta - 1971 and 1976-1981

(millions of dollars)

	1971	1976	1977	1978	1979	1980	1981
Cash Receipts							3,845.6
Income-in-Kind						34.1	35.4
Supplementary Payments					—	12.6	30.6
Realized Gross Income						3,182.4	3,911.7
Operating and Depreciation Charges						2,508.5	2,863.9
Realized Net Income						673.9	1,047.8
Value of Inventory Charges						121.8	22.6
Total Gross Income	828.2	1,973.8	1,936.0	2,410.5	2,938.3	3,303.9	3,934.2
Total Net Income	223.2	506.8	374.5	638.8	764.1	795.4	1,070.4

Table 2.13 Farm Operating Expenses and Depreciation Charges - Alberta - 1971 and 1976-1981

(millions of dollars)

	1971	1976	1977	1978	1979	1980	1981
Taxes							
Gross Farm Rent							
Wages							
Interest and Indebtedness							
Fuel and Lubricants							
Machinery Repair & Other Expenses							
Fertilizer & Limestone							252.0
Other Crop Expenses							129.5
Feed							217.1
Other Livestock Expenses							
Repairs to Buildings							
Electricity & Telephones							
Miscellaneous							
Total Operating Expenses	484.7	1,157.2	1,218.0	1,387.2	1,718.2	1,981.5	2,283.8
Depreciation Charges							
Buildings							
Machinery							
Total Operating Expenses & Depreciation Charges	605.0	1,467.0	1,561.5	1,771.7	2,174.2	2,508.5	2,863.9

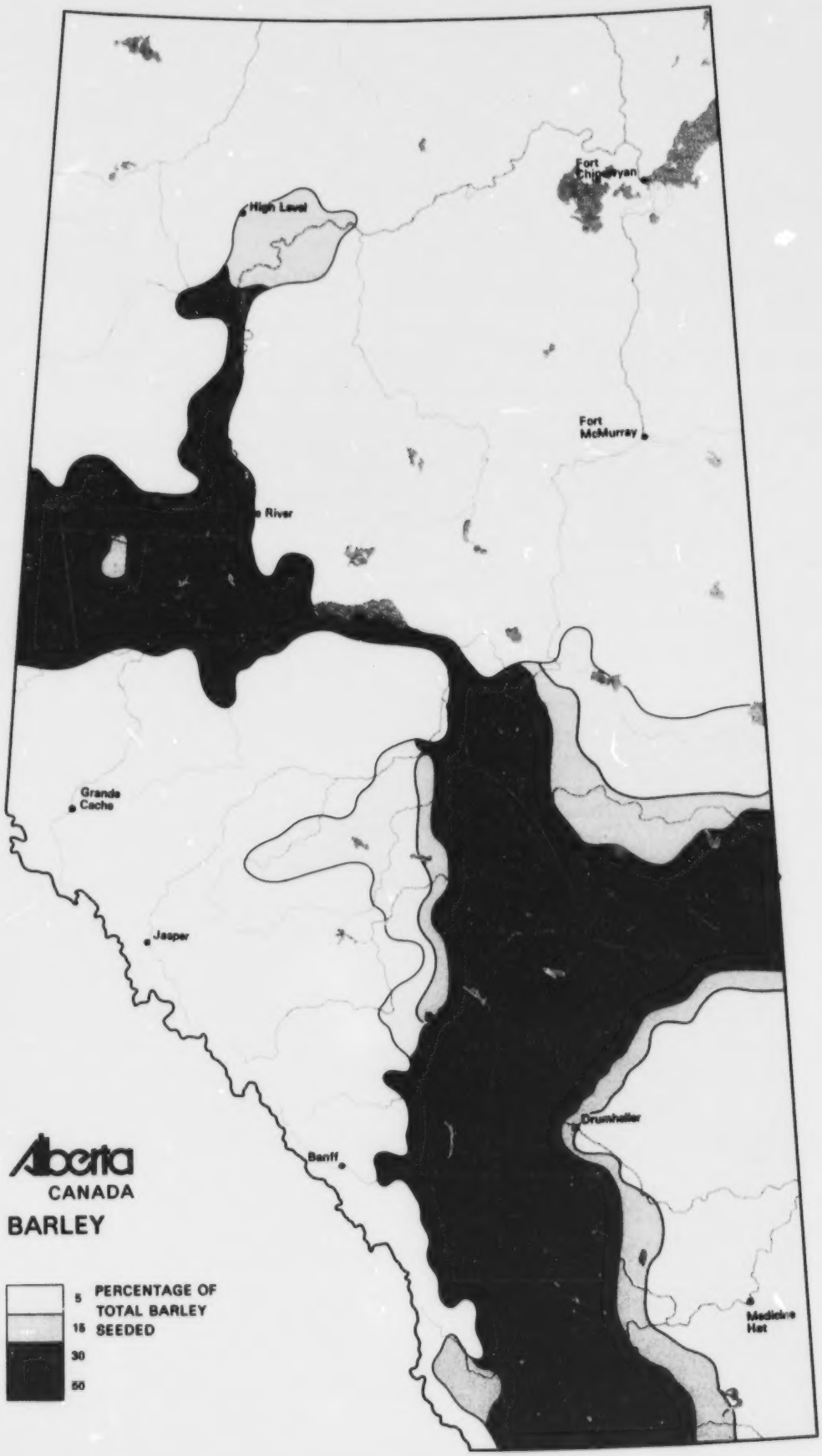

High Level
Fort Chipewyan
Fort McMurray
River
Grande Cache
Jasper
Banff
Drumheller
Medicine Hat
Alberta
CANADA
BARLEY
5
15
30
50
PERCENTAGE OF TOTAL BARLEY SEEDED

Table 2.14 Farm Machinery and Equipment, by Type, by Census Division - Alberta - 1981 (number)

	CD 1	CD 2	CD 3	CD 4	CD 5	CD 6	CD 7	CD 8
Automobiles								5,996
Motor Trucks								11,078
Tractors								11,808
Grain Combines								3,456
Swathers								3,759
Balers								3,819
Forage Crop Harvesters								609
Other Machinery and Equipment (Value — million $)								91.0

	CD 9	CD 10	CD 11	CD 12	CD 13	CD 14	CD 15	Alberta Total
Automobiles								
Motor Trucks								
Tractors								
Grain Combines								
Swathers								
Balers								
Forage Crop Harvesters								
Other Machinery and Equipment (Value — million $)								

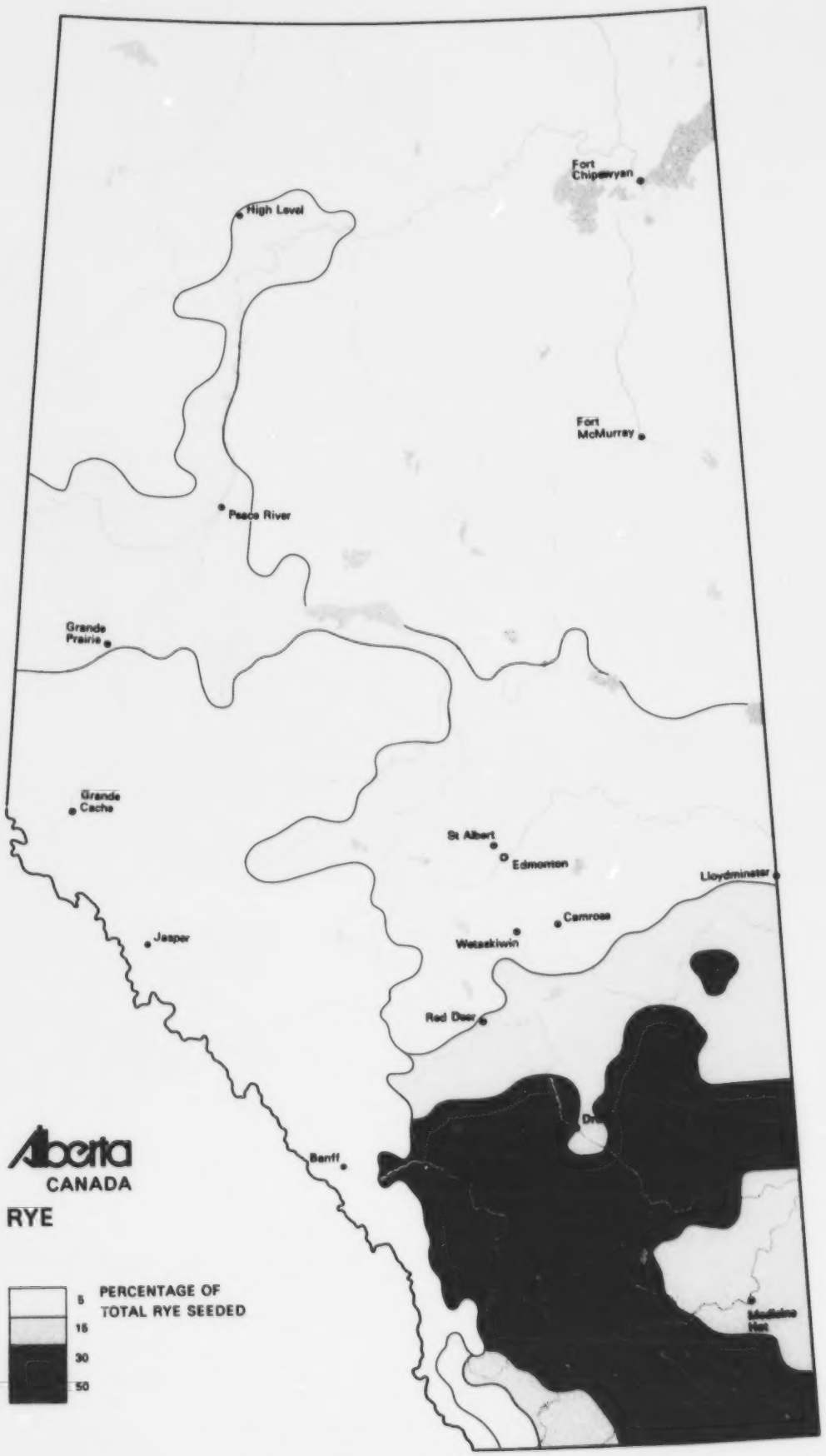

Fort Chipewyan
High Level
Fort McMurray
Peace River
Grande Prairie
Grande Cache
St Albert
Edmonton
Lloydminster
Camrose
Jasper
Wetaskiwin
Red Deer
Banff
Alberta
CANADA
RYE
PERCENTAGE OF TOTAL RYE SEEDED
5
15
30
50

Table 2.15 Census Farms by Number, Area, Type of Operator and by Gross Value of Products Sold by Census Division - Alberta - 1981

	Alberta	CD 1	CD 2	CD 3	CD 4	CD 5	CD 6	CD 7
Number of Farms	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4,312	3,858
Hectares '000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,130	1,799
Average Farm Size, Hectares	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	262	466
Number of Farms Operated, Classified By Form of Tenure of Operator								
Owners	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2,577	1,812
Tenants	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	371	308
Part Owner, Part Tenant	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,364	1,738
Farms Reporting 1980 Sales of:								
$250,000 and Over	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	322	132
$100,000 - $249,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	500	587
$50,000 - $99,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	709	981
$25,000 - $49,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	705	868
$10,000 - $24,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	772	695
$5,000 - $9,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	496	271
$2,500 - $4,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	309	164
Under $2,500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	304	190

	CD 8	CD 9	CD 10	CD 11	CD 12	CD 13	CD 14	CD 15
Number of Farms	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	918	8,239
Hectares '000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	158	2,472
Average Farm Size, Hectares	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	193	300
Number of Farms Operated, Classified By Form of Tenure of Operator								
Owners	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	672	5,380
Tenants	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	36	345
Part Owner, Part Tenant	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	210	2,514
Farms Reporting 1980 Sales of:								
$250,000 and Over	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	44
$100,000 - $249,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	856
$50,000 - $99,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,617
$25,000 - $49,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,586
$10,000 - $24,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,027
$5,000 - $9,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,150
$2,500 - $4,999	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	823
Under $2,500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,287

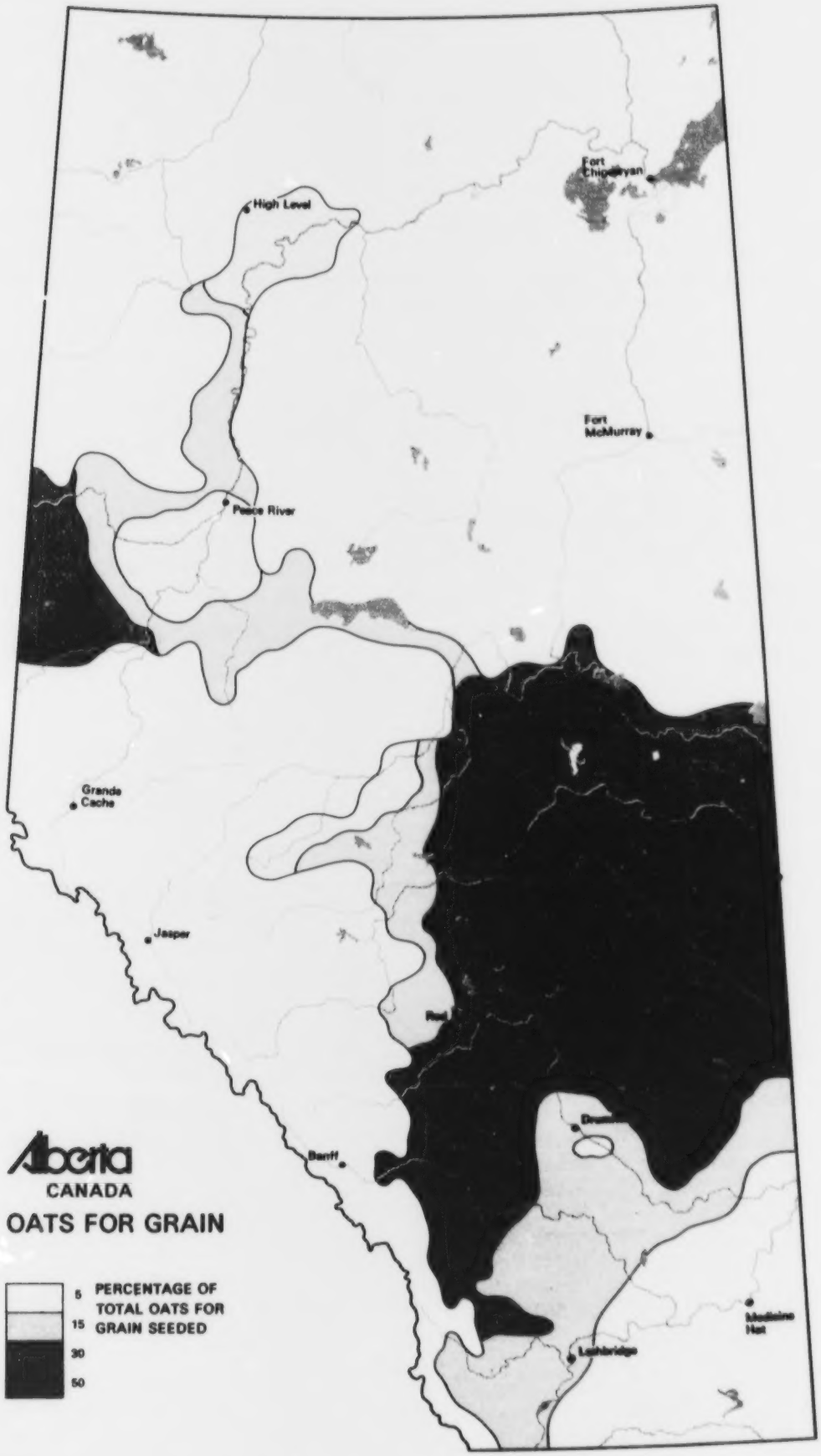
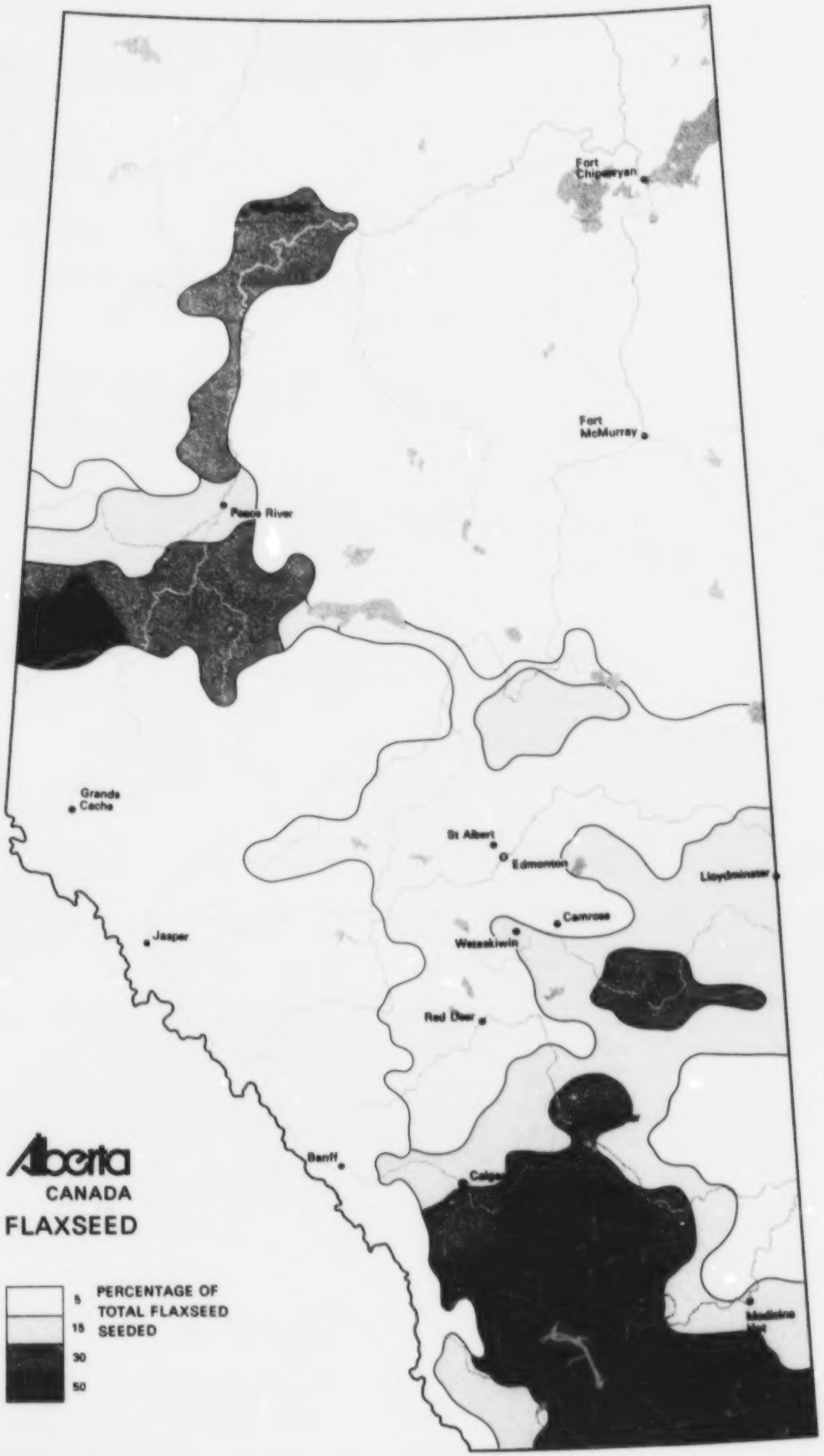
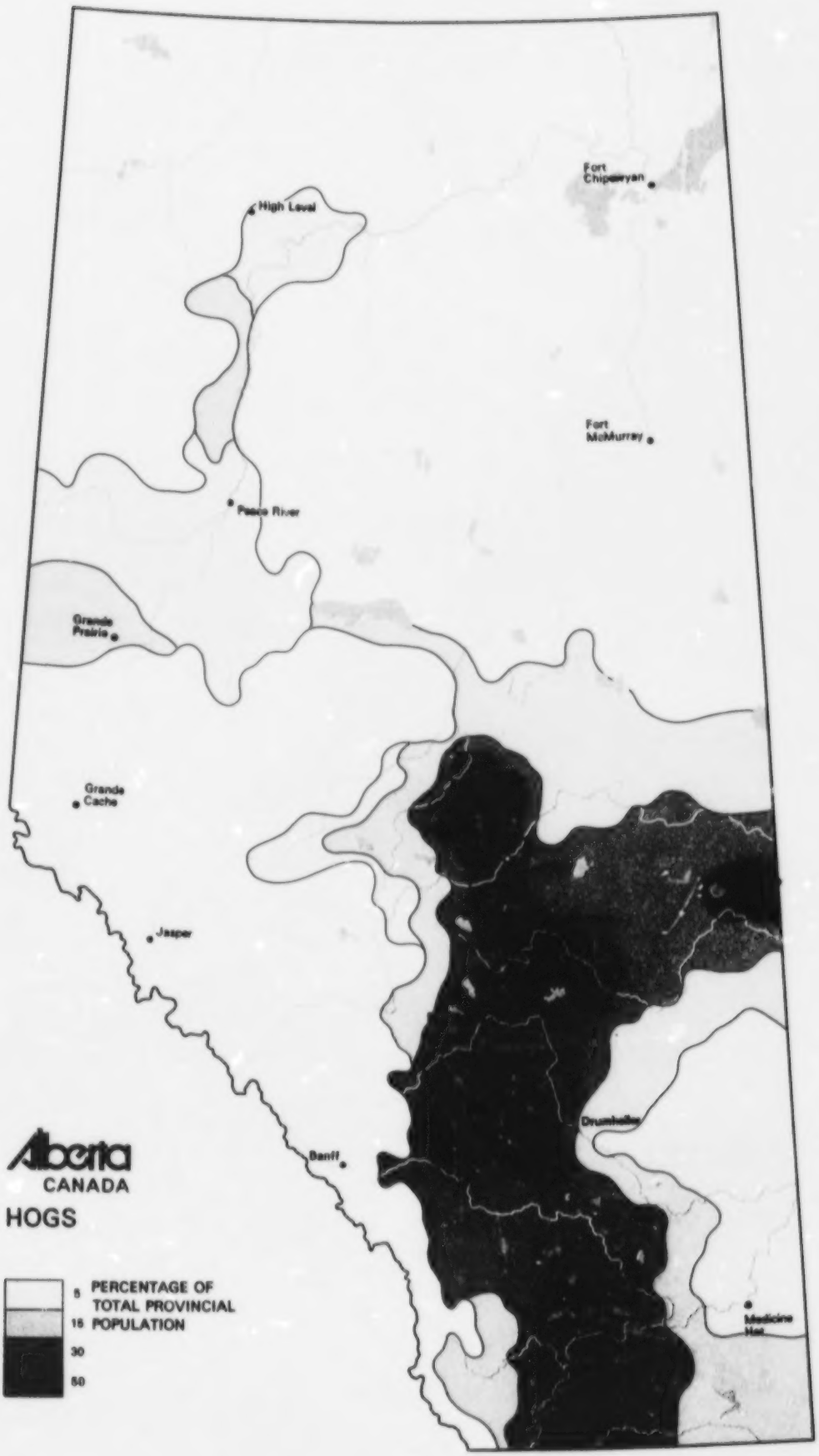

High Level
Fort Chipewyan
Fort McMurray
Peace River
Grande Cache
Jasper
Banff
Medicine Hat
Lethbridge
Alberta
CANADA
OATS FOR GRAIN
5
15
30
50
PERCENTAGE OF TOTAL OATS FOR GRAIN SEEDED

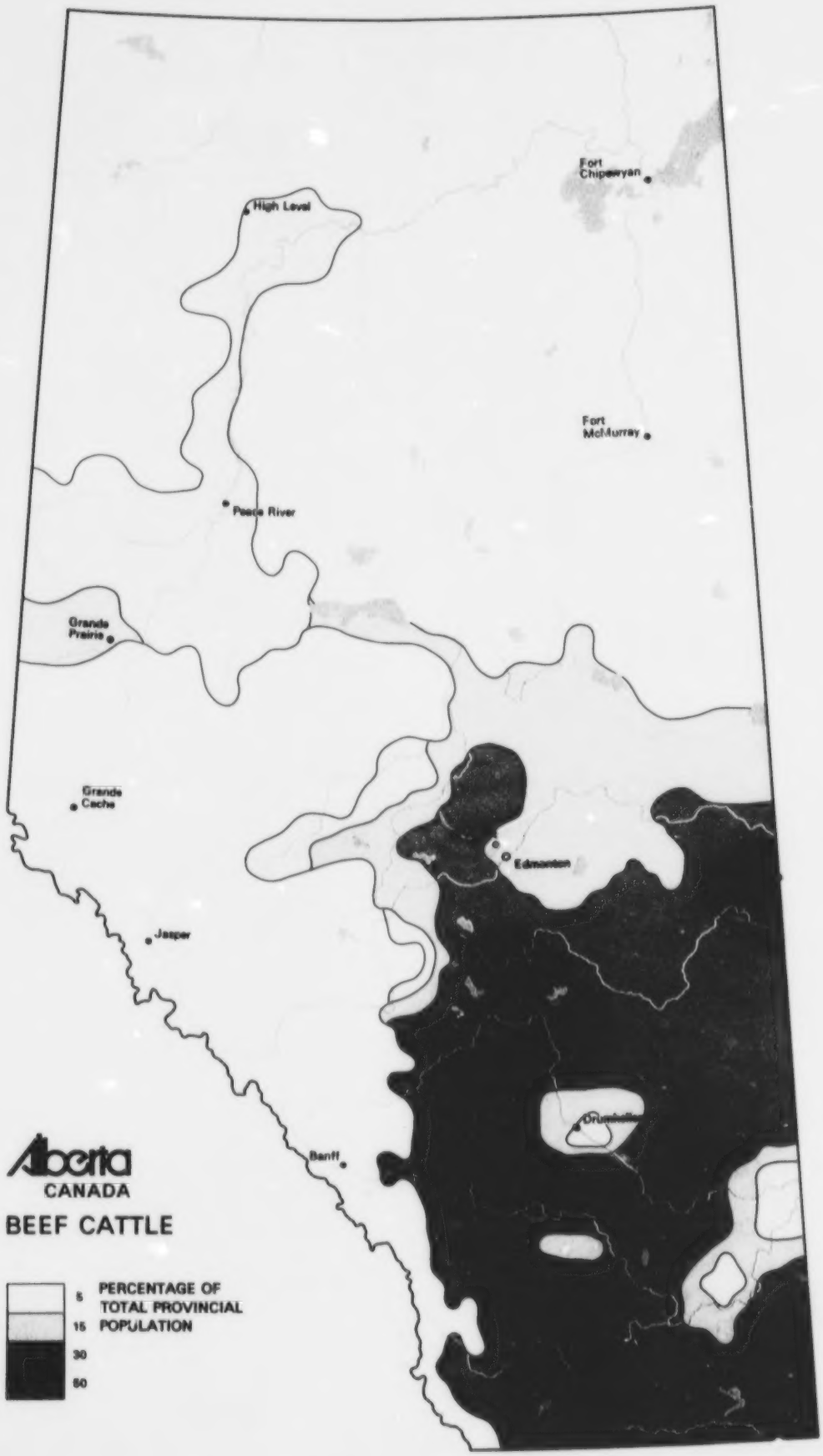
Table 2.16 Census Farms with Sales Over $2,500 by Major Product, by Census Division - Alberta - 1980

	Alberta	CD 1	CD 2	CD 3	CD 4	CD 5	CD 6	CD 7
Farms with Sales $2,500 or More								3,676
Major Product Type:								
Dairy							219	88
Cattle								1,278
Hogs								60
Poultry								20
Wheat								703
Small Grains								1,191
Other Field Crops								16
Fruits & Vegetables								—
Miscellaneous Specialty								38
Mixed Farms								
Livestock								
Field Crops								
Other Combination								

	CD 8	CD 9	CD 10	CD 11	CD 12	CD 13	CD 14	CD 15
Farms with Sales $2,500 or More								
Major Product Type:								
Dairy								
Cattle								
Hogs								
Poultry								
Wheat								
Small Grains								
Other Field Crops								
Fruits & Vegetables								
Miscellaneous Specialty								
Mixed Farms								
Livestock								
Field Crops								
Other Combination								


Fort Chipewyan
Fort McMurray
Peace River
Grande Cache
St Albert
Edmonton
Lloydminster
Camrose
Jasper
Wetaskiwin
Red Deer
Banff
Medicine Hat
Alberta
CANADA
FLAXSEED
5
15
30
50
PERCENTAGE OF TOTAL FLAXSEED SEEDED


Fort Chipewyan
High Level
Fort McMurray
Peace River
Grande Prairie
Grande Cache
Jasper
Drumheller
Banff
Medicine Hat
Alberta
CANADA
HOGS
5
15
30
60
PERCENTAGE OF TOTAL PROVINCIAL POPULATION


Fort Chipewyan
High Level
Fort McMurray
Peace River
Grande Prairie
Grande Cache
Edmonton
Jasper
Banff
Alberta
CANADA
BEEF CATTLE
5
15
30
60
PERCENTAGE OF TOTAL PROVINCIAL POPULATION

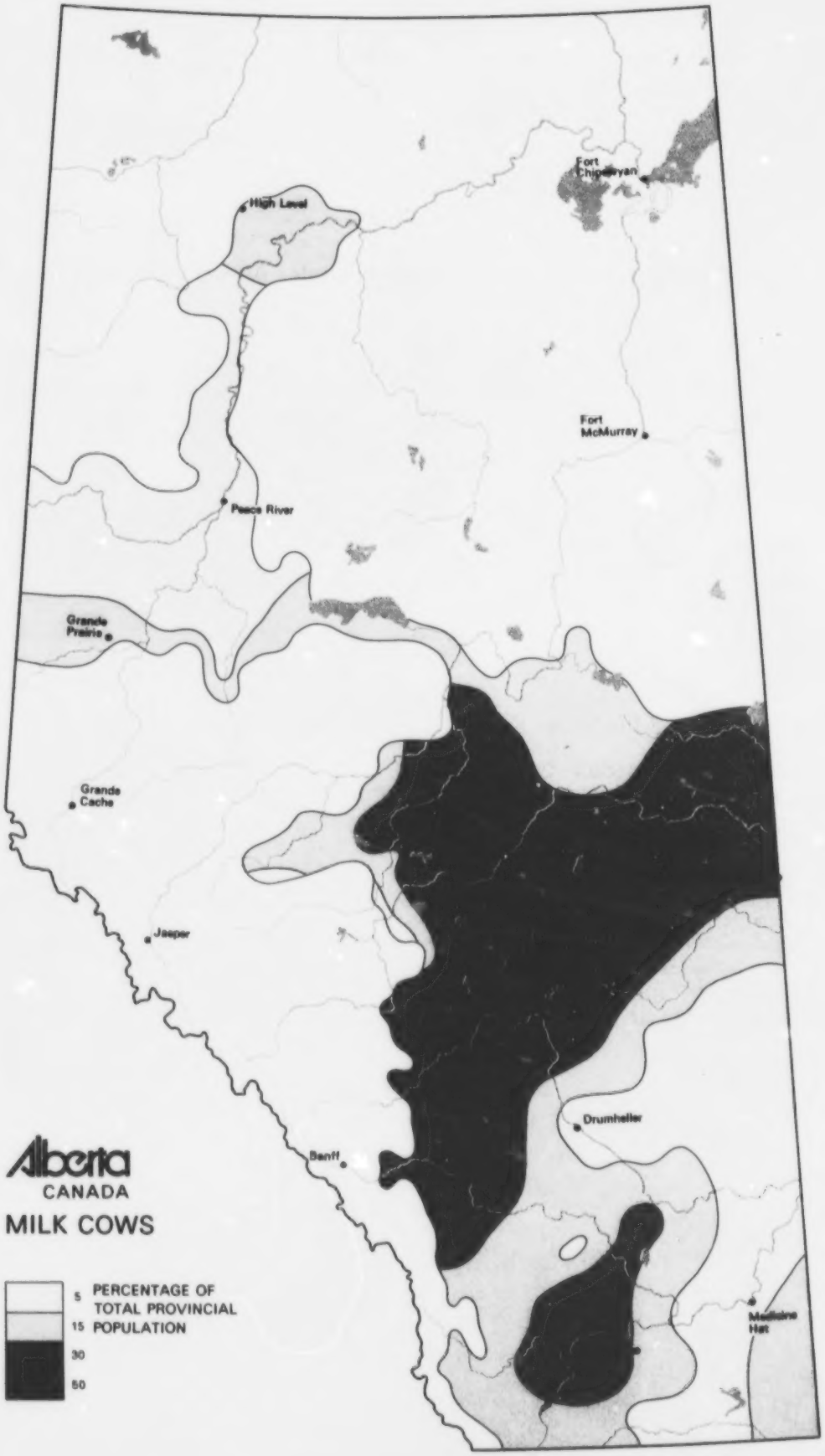

High Level
Fort Chipewyan
Fort McMurray
Peace River
Grande Prairie
Grande Cache
Jasper
Banff
Drumheller
Medicine Hat
Alberta
CANADA
MILK COWS
5
15
30
50
PERCENTAGE OF TOTAL PROVINCIAL POPULATION

Table 2.17 Animal Slaughterings in Inspected Establishments - Alberta - 1959-1981 (number)

Year	Cattle	Calves	Hogs	Sheep & Lambs
1959				
1960				
1961				
1962				
1963				
1964				
1965				
1966				
1967				
1968				
1969				
1970				
1971				
1972				
1973				
1974				
1975				
1976				
1977				
1978				
1979				
1980				
1981				

Table 2.18 Livestock and Poultry on Farms, by Census Division - Alberta - 1981 (numbers in thousands)

	Alberta	CD 1	CD 2	CD 3	CD 4	CD 5	CD 6	CD 7	CD 8	CD 9	CD 10	CD 11	CD 12	CD 13	CD 14	CD 15
Cattle																
Pigs																
Sheep																
Horses																
Goats																
Rabbits																
Chickens																
Turkeys																
Geese																
Ducks																

Minerals

Alberta is richly endowed with mineral resources and leads all the provinces in value of mineral production. Most valuable are the fossil fuels (discussed in the Energy Resources section), but the province has plenty of other minerals of the non-fuel variety. These are mainly the industrial, or nonmetallic minerals — the basic building blocks of industry. Metallic minerals have little importance in Alberta; few deposits exist and no production has taken place.

The industrial minerals exist in variety and in quantity, forming a broad raw material base for Alberta industry. The value of production in 1981 was $919 million, third highest among the provinces, and about 20 per cent of the national total for industrial minerals. Nearly three-quarters of the Alberta production is accounted for by sulphur, one of few minerals valued highly enough for export marketing. Most industrial minerals, owing to their high bulk, low value nature, do not have long distance marketing potential. Thus, except for sulphur, most of the production is consumed within the province.

Alberta's industrial minerals fall into two main use groups: those for construction materials and those for chemical industries. The metallic minerals, though unused as yet, have some potential for future commercial development.

Minerals For Construction Materials Industries

Minerals of this group include the raw materials of cement, ceramics, and building products manufacture, and the mineral materials (natural or manufactured) used for aggregates. These are sufficiently developed to supply local needs, with some exports of construction materials outside the province.

Cement

One of the most versatile and widely used of all construction materials, portland cement is manufactured from three essential mineral raw materials — limestone, clay, and gypsum.

The Alberta cement industry currently has two operating plants, which have recently undergone major expansions to bring the total annual production capacity to 2.6 million tonnes. Production in 1981 was 1.4 million tonnes valued at $135.4 million. The principal raw material for cement making is limestone, about 1.4 tonnes being required per tonne of cement. This is supplied from rock quarries in the mountains. Clays are widely available and are obtained from nearby the cement plant sites. However, the gypsum requirements must be imported, mainly from British Columbia.

Limestone

Huge reserves of limestone are found in rock formations exposed along many of the ranges of the Rocky Mountains. These limestone formations underlie the Plains as well, but are generally too deep for exploitation except in the northeast region. Shallow, flat lying beds of limestone are exposed in the vicinity of Fort McMurray.

The best limestone deposits are found on the easternmost ranges of the Rocky Mountains. Development potential exists where the deposits lie adjacent to railway lines, and quarries are operated at four such localities. The two largest, at Cadomin and Exshaw, each currently produce 900,000 tonnes of limestone annually for cement making. From Cadomin the limestone is hauled to a cement plant at Edmonton, a rail distance of 290 kilometres. At Exshaw, the cement plant is situated on the quarry site. Other quarries in the mountains produce limestone mainly for lime manufacture.

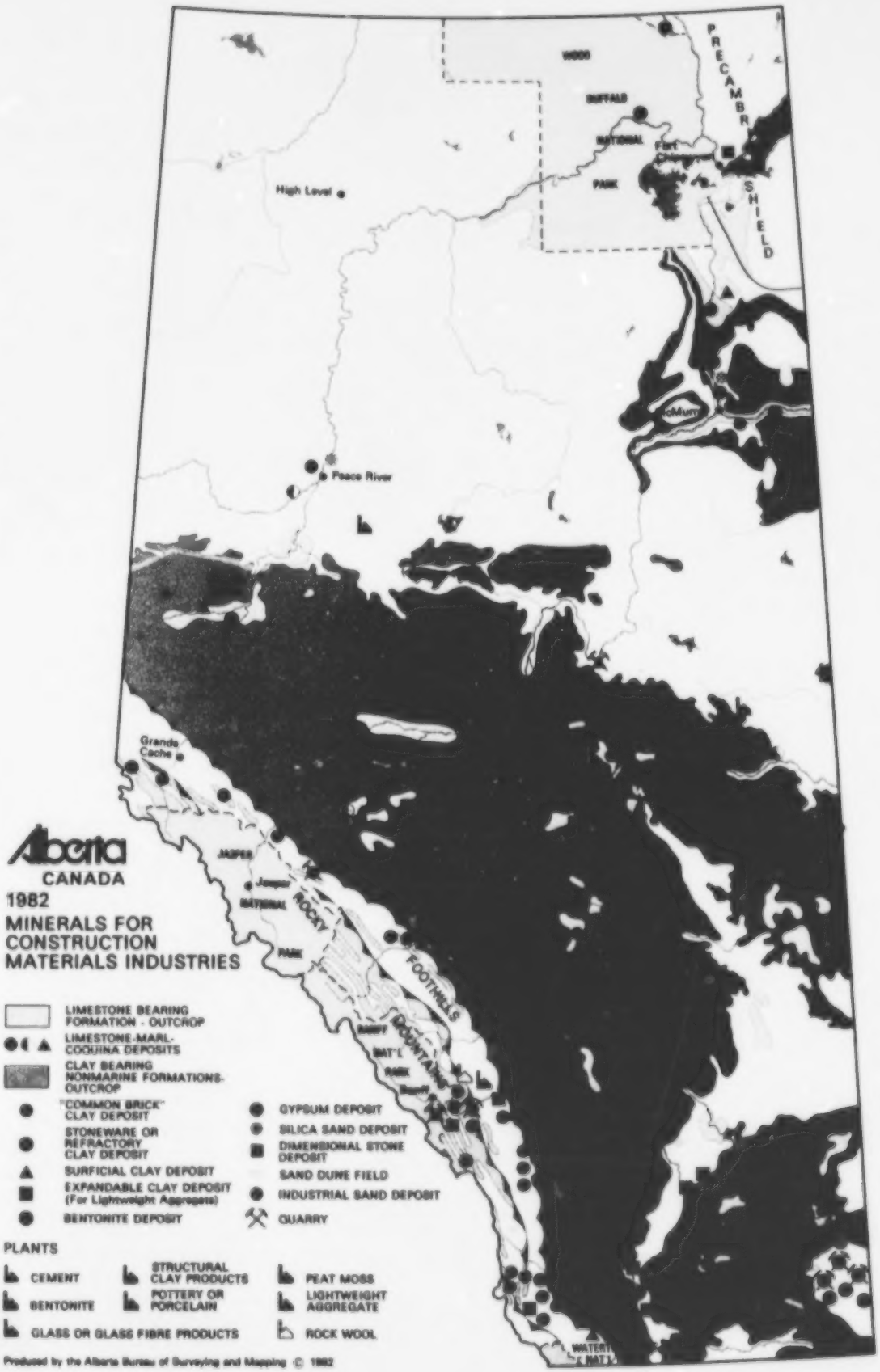
A material that can substitute for limestone in cement making is marl, also widely found in Alberta. However, most deposits are small. One deposit near Clyde, 65 kilometres north of Edmonton, was for a time worked for use in a small-scale cement plant, but that plant recently closed.

Clays and Shales

Clays, and their indurated rock equivalent, shales, are very widespread in Alberta. They are found throughout the Plains in virtually all the bedrock formations and in many of the surficial deposits, and extensively in the mountain region as well. The clays are mostly the low grade, low-alumina variety, suitable only for cement or low-value ceramic use. In cement making, no special grade of clay is needed and manufacturers normally can use whatever lies handiest to the plant.

For ceramics, the best clays are found in the non-marine bedrock formations. They are primarily the "common brick" type, but some intermediate grades such as stoneware clay and fireclay are known in a few localities. These are useful for higher value ware such as sewer pipe, flue liners, facing brick, pottery and stoneware crocks, and for low heat-duty refractories. High grade clays of the type required for whiteware are not found in the province.

The better grades of clay are found mostly in the Cypress Hills area of southeastern Alberta. These are used for structural clay wares in plants at Medicine Hat and Redcliff, and also are blended with imported clays for use in pottery plants in the area. Many of the clays found in this area are of stoneware grade. Other stoneware clays are known in widely scattered deposits in Alberta, notably in the Fort McMurray area


WOOD
BUFFALO
NATIONAL
PARK
Fort Chipewyan
PRECAMBRIAN SHIELD
High Level
Peace River
Grande Cache
JASPER
Jasper
NATIONAL
PARK
ROCKY MOUNTAINS
FOOTHILLS
BANFF
NAT'L
PARK
Alberta
CANADA
1982
MINERALS FOR CONSTRUCTION MATERIALS INDUSTRIES
LIMESTONE BEARING FORMATION - OUTCROP
LIMESTONE-MARL-COQUINA DEPOSITS
CLAY BEARING NONMARINE FORMATIONS-OUTCROP
"COMMON BRICK" CLAY DEPOSIT
STONEWARE OR REFRACTORY CLAY DEPOSIT
SURFICIAL CLAY DEPOSIT
EXPANDABLE CLAY DEPOSIT (For Lightweight Aggregate)
BENTONITE DEPOSIT
GYPSUM DEPOSIT
SILICA SAND DEPOSIT
DIMENSIONAL STONE DEPOSIT
SAND DUNE FIELD
INDUSTRIAL SAND DEPOSIT
QUARRY
PLANTS
CEMENT
BENTONITE
GLASS OR GLASS FIBRE PRODUCTS
STRUCTURAL CLAY PRODUCTS
POTTERY OR PORCELAIN
PEAT MOSS
LIGHTWEIGHT AGGREGATE
ROCK WOOL
Produced by the Alberta Bureau of Surveying and Mapping © 1982

underlying the Athabasca Oil Sands. Fireclay is found in association with coal measures in at least one locality — at Wabamun, 60 kilometres west of Edmonton. Surficial clays, despite certain quality deficiencies, have had widespread use for brick making in the past, mainly because they were handiest. Currently, a brick plant in Edmonton uses glacial lake clays, quarried at the plant site and also near the town of Athabasca, 130 kilometres north.

The value of ceramic clay products produced in Alberta in 1981 was $14.2 million. Most structural wares are used within the province in the construction industry. Other products are marketed widely in western Canada. Alberta clays and shales also are used for manufacturing lightweight aggregate (see Construction Aggregates), and mineral wool fibre. A dolomitic shale is quarried in the mountains near Exshaw as raw material for a rock wool insulation plant. Production values are not reported for these products.

Gypsum

Alberta's annual consumption of gypsum currently totals about 325,000 tonnes valued at $2.4 million. About 260,000 tonnes are used for gypsum wallboard manufacture at three plants in the province, the remainder for cement manufacture at two cement plants. All the gypsum is imported, mostly from British Columbia. Several gypsum deposits known to exist in Alberta are undeveloped, owing to remote or restricted locations or difficult accessibility.

The deposits with best development potential are found in northeastern Alberta. One of these, at Peace Point on the Peace River, lies within Wood Buffalo National Park, but on lands claimed by the Indians. Should these lands eventually convert to Indian Reserve, the deposit — which is of very high grade and extent — could be opened to development. Another deposit, underlying the Athabasca River valley downstream from Fort McMurray, is better located but of lower grade. Development of either deposit will have to await the industrialization expected for this region with further oil sands development

Silica Sand

Consumption of silica sand in Alberta amounts annually to about 100,000 tonnes for glass and glass fibre manufacture and another 100,000 tonnes for hydraulic fracturing, sand blasting, foundries, and a host of minor uses. These silica sand requirements are met by processing and upgrading local dune sands and by imports into the province. Production of local sand was valued at $3.4 million in 1981.

Most of the required high quality silica sand is imported. A few sources of good quality sand exist in Alberta but are remote from markets and are undeveloped. The best prospective deposits are found along the Peace River in northwestern Alberta, along the Clearwater River in northeastern Alberta, and in the tailings of Athabasca Oil Sands extraction plants.

Dimension Stone

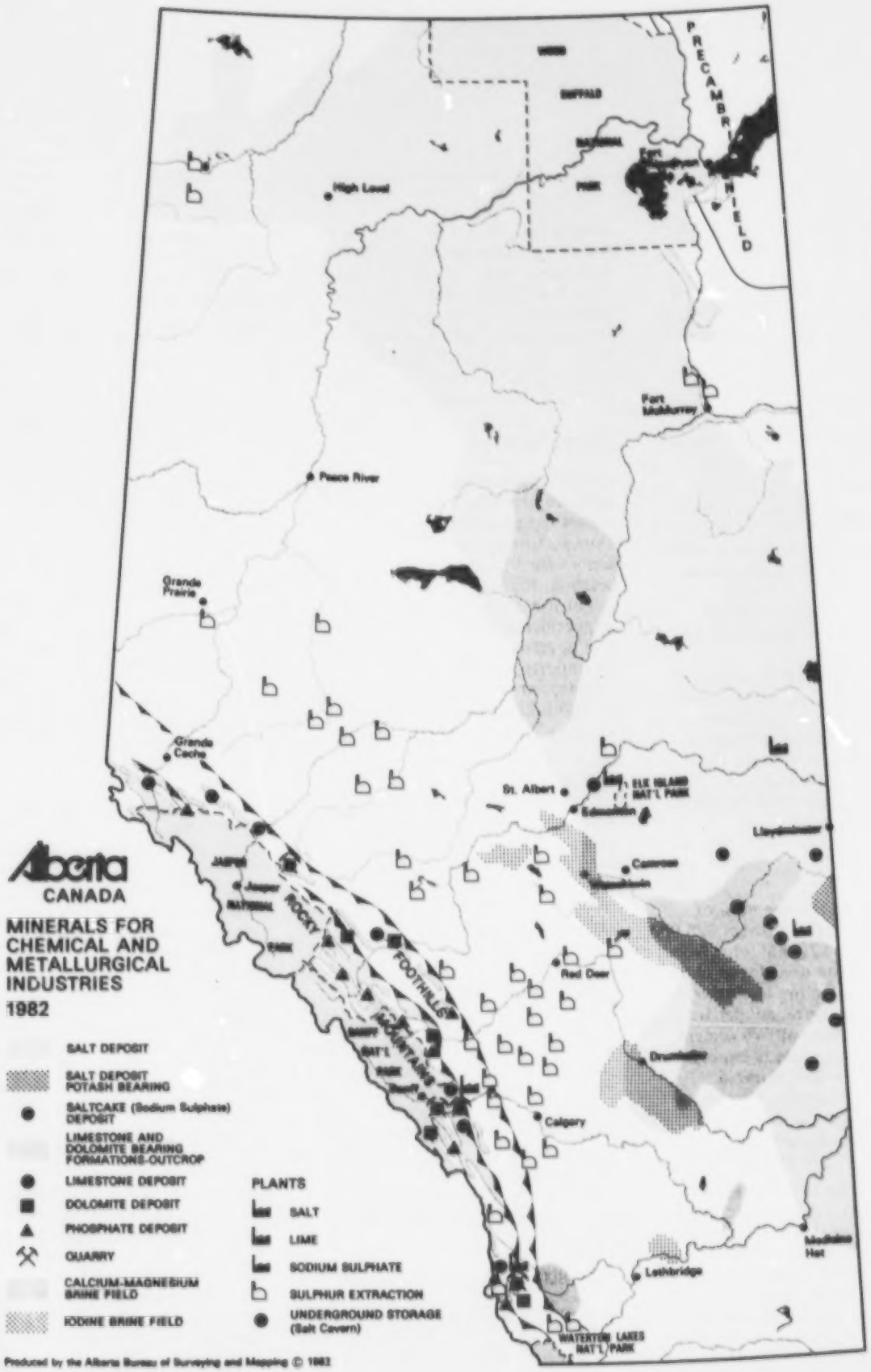
Stone marketed in specified shapes and sizes for building and ornamental purposes includes many types, the most common being granite, sandstone, limestone, and marble. Currently the only dimension stone produced in Alberta is sandstone — a very fine grained flaggy type — from quarries near Canmore in the Rocky Mountains. Production volume is small.

Construction Aggregates

Basic materials of construction, aggregates constitute by far the largest tonnage volume of industrial mineral production in Alberta. Although the lowest priced per unit weight, they are exceeded in value of production only by sulphur and cement. Being heavy, bulky, low priced materials, aggregates cannot be marketed beyond distances of a few kilometres. Consequently, numerous aggregate producing sites are scattered across the province to serve local construction requirements. Sand and gravel comprise the bulk of aggregate production and use. Manufactured lightweight aggregates have specialized application mainly in large urban construction projects. Crushed stone aggregate is not produced in the province.

Alberta has rich resources of sand and gravel, which are developed to the extent of the province's needs. Production in 1981 was 25 million tonnes valued at $58.8 million. Road building accounts for about two-thirds of the material used, with the balance going for use in concrete and asphalt mixes, dam construction, railway ballast, and a number of minor uses. The sands and gravels are found in a variety of geologic types of deposits, distributed widely thoughout the province though not everywhere in accordance with local need. Haulage distance will be an increasingly critical factor in future developments.

Lightweight aggregate production is mostly expanded clays and shales made from local materials. Some imported vermiculite and perlite also is made into expanded aggregates for specialized application in lightweight plaster and insulating concrete. Expandable clays and shales are extensive in Alberta, though many are located too far from urban markets to warrant development. Two plants in the Edmonton area produce expanded aggregate from surface clay deposits on the plant sites. Another in Calgary uses shale quarried a few kilometres south of the city. Total production from these plants is not reported.


PRECAMBRIAN SHIELD
High Level
Fort McMurray
Peace River
Grande Prairie
Grande Cache
St. Albert
ELK ISLAND NAT'L PARK
Camrose
Red Deer
Drumheller
Calgary
Lethbridge
Medicine Hat
WATERTON LAKES NAT'L PARK
JASPER NATIONAL PARK
ROCKY MOUNTAINS
FOOTHILLS
Alberta
CANADA
MINERALS FOR CHEMICAL AND METALLURGICAL INDUSTRIES
1982
SALT DEPOSIT
SALT DEPOSIT POTASH BEARING
SALTCAKE (Sodium Sulphate) DEPOSIT
LIMESTONE AND DOLOMITE BEARING FORMATIONS-OUTCROP
LIMESTONE DEPOSIT
DOLOMITE DEPOSIT
PHOSPHATE DEPOSIT
QUARRY
CALCIUM-MAGNESIUM BRINE FIELD
IODINE BRINE FIELD
PLANTS
SALT
LIME
SODIUM SULPHATE
SULPHUR EXTRACTION
UNDERGROUND STORAGE (Salt Cavern)
Produced by the Alberta Bureau of Surveying and Mapping © 1982

The main application of expanded clay aggregate is in concrete blocks, where the reduced weight results in lower handling and transportation costs. Its use, also, in poured-in-place concrete has increased significantly, particularly in high-rise structures, where the reduced dead load reduces the need for structural steel and allows for greater design flexibility. Additional advantages come from better thermal and acoustical insulation and fire resistance.

Other Minerals: Bentonite and Peat Moss

These are minerals of miscellaneous uses, not strictly for construction materials, but related to that category.

Bentonite is very common in Alberta but pure deposits are rare. Only one deposit is currently worked in the province, near Rosalind along the Battle River, 110 kilometres southeast of Edmonton. The total production of about 12,000 tonnes per year is used mainly in foundries and for lining dams and ponds.

Peat moss bogs are widespread throughout the northern two-thirds of the province. Peat moss is commercially harvested in four localities, the largest production coming from a plant near Evansburg, 80 kilometres west of Edmonton Total production in 1981 was 35,000 tonnes valued at $4.4 million. Much of the production is exported, mainly for horticultural use.

Minerals For Chemical Industries

Alberta minerals (other than hydrocarbons) that serve as basic raw materials for the chemical industries include salt, sodium sulphate, sulphur, and limestone. The end users are the wood pulp, fertilizer, and lime industries, in which the end products commonly bear little similarity to the basic minerals as a result of chemical reforming. The products have much higher unit values, even to the extent that some are commodities of world trade.

Salt

The wood pulp industry in Alberta and western Canada provides a major market for the province's output of salt. This salt is not used directly as such, but rather in the form of chloralkali chemicals, including chlorine, sodium hydroxide, and sodium chlorate. However, part of Alberta's salt production is used directly, for purposes ranging from household consumption to ice control on roads.

Alberta's salt deposits are of vast extent, underlying almost half the province in beds 60 metres or more in thickness. Currently, there are two salt plants operating: one at Fort Saskatchewan, a few kilometres northeast of Edmonton, where salt is brined from beds 1,900 metres deep for chloralkali chemicals manufacture; and one at Lindberg about 190 kilometres east of Edmonton, where salt for domestic and industrial use is brined from beds 1,100 metres deep. In addition, the salt beds are utilized indirectly at three localities for underground storage of petroleum products, in artificially created caverns. The 1981 salt production was 938,000 tonnes valued at $13.4 million. Approximately 85 per cent of this production was for chemical use.

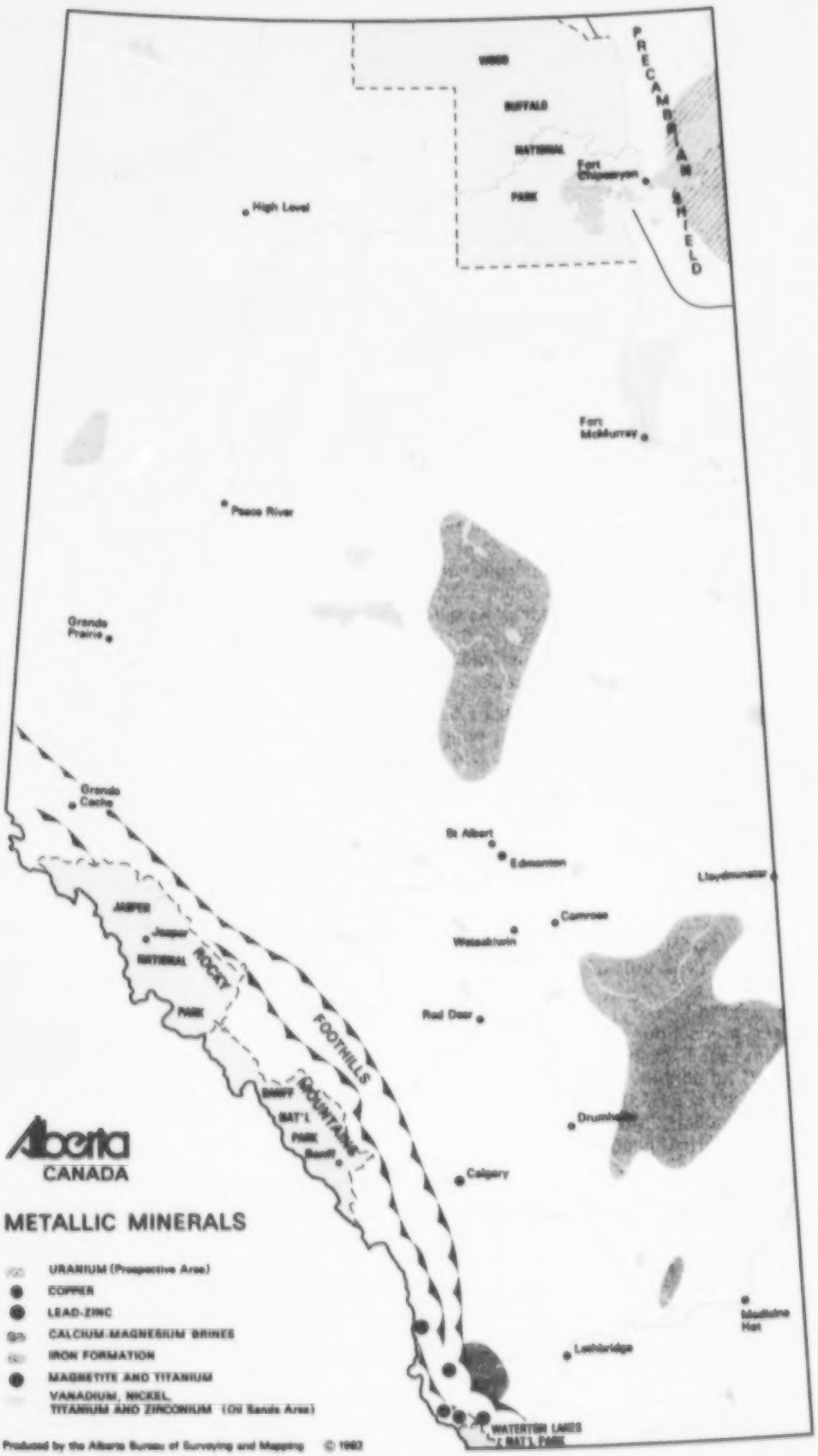
Sodium Sulphate

Alberta produces 60,000 tonnes per year of sodium sulphate, about 10 per cent of Canada's output. Production is from a single plant at Metisko Lake about 210 kilometres east of Red Deer. In 1981 the production was valued at $3.3 million. Alberta's sodium sulphate is a high purity product used mainly in detergents, though the bulk of Canadian production has its chief use in pulp processing. Other minor uses are in the manufacture of glass, sodium chemicals, pharmaceuticals, fertilizers, and in dyeing, tanning and uranium processing. Reserves in the Metisko Lake deposit are estimated in the order of 3 million tonnes. Several other known deposits in Alberta are too small for economic development at present.

Sulphur

Alberta is a major world producer and exporter of sulphur, having the world's largest production from hydrocarbon sources. Most of it comes as a co-product of natural gas processing, collected in sulphur extraction plants scattered throughout the province. A small percentage is recovered from synthetic crude oil extracted from the Athabasca Oil Sands. In 1981 Alberta sulphur production totalled 5.6 million tonnes, with sales actually totalling 8.0 million tonnes valued at $675 million. Less than 15 per cent of Alberta sulphur sales are to Canadian industries; the rest is exported.

The wood pulp processing and fertilizer industries are the principal domestic consumers of sulphur. The former utilizes sulphur for the manufacture of bleaching liquor in the kraft process, and for bleaching and cooking liquors in the sulfide process. Its use in the fertilizer industry is for leaching (by sulphuric acid) of phosphate rock for the manufacture of phosphates, and also as a component in the manufacture of some fertilizers (for example, ammonium sulphate). Western Canada's fertilizer industry is based largely in Alberta because of the combination of availability of low-cost sulphur and of natural gas. Much of the production is exported for the large agricultural market in the western United States. Among many lesser applications, sulphur is used in the manufacture of chemicals,


PRECAMBRIAN SHIELD
WOOD BUFFALO NATIONAL PARK
Fort Chipewyan
High Level
Fort McMurray
Peace River
Grande Prairie
Grande Cache
ROCKY MOUNTAINS
FOOTHILLS
JASPER NAT'L PARK
BANFF NAT'L PARK
Banff
St Albert
Edmonton
Lloydminster
Camrose
Wetaskiwin
Red Deer
Drumheller
Calgary
Lethbridge
Medicine Hat
WATERTON LAKES NAT'L PARK
Alberta
CANADA
METALLIC MINERALS
URANIUM (Prospective Area)
COPPER
LEAD-ZINC
CALCIUM-MAGNESIUM BRINES
IRON FORMATION
MAGNETITE AND TITANIUM
VANADIUM, NICKEL, TITANIUM AND ZIRCONIUM (Oil Sands Area)
Produced by the Alberta Bureau of Surveying and Mapping © 1982

rubber products, explosives, plastic and synthetic resins, and in petroleum refining and uranium ore processing.

Sulphur extraction plants are scattered throughout southwest and west-central Alberta wherever sour natural gas is produced. Although the hydrogen sulphide content of sour gas fields ranges as high as 91 per cent, most producing fields contain from one to twenty per cent. The percentages generally increase to the southwest with increasing formation depths and temperatures. Proved recoverable reserves in 1981 were about 130 million tonnes, with an additional 16 million tonnes stockpiled.

Lime, Limestone and Dolomite

Lime produced in Alberta is the high-calcium type requiring high-purity limestone as the starting raw material. The limestone production for lime making is about 430,000 tonnes yearly, produced from quarries in the Crowsnest Pass and the Bow Valley. Large deposits of dolomite located near the limestones are not utilized, as dolomitic (or magnesian) lime is not currently produced in the province.

The 1981 production of Alberta lime was 170,000 tonnes valued at $9.8 million. This production serves many markets both in the province and outside, the major users being the chemical and metallurgical industries. Pulverized limestone rock is also produced for direct use as a substitute in some lime applications.

Metallic Minerals

Few metallic mineral deposits are known in Alberta. The only production has been small amounts of placer gold, recovered from river gravels and as a by-product of gravel screening and washing operations (in pre-glacial deposits). Production in 1981 was reported as 121,000 grams valued at just over $2 million.

Potential for major metallic minerals production exists mainly in the Canadian Precambrian Shield in northeastern Alberta, and in the iron ore deposits of the Clear Hills area in northwestern Alberta. The Precambrian Shield provides a favourable geological setting for metallic mineralization. Uranium showings have been found in the area adjacent to Lake Athabasca, and uranium exploration on the Shield is currently active. The Clear Hills iron deposits, with 180 million tonnes of proven strippable ore, constitute the largest potential source of iron ore in the four western provinces. Their development is still awaiting an economically viable beneficiating and smelting process. The low grade (35 per cent Fe) and complex metallurgy of the ore have barred development to date.

Magnesium-rich brines exist in several of Alberta's subsurface reservoir formations. These brines have magnesium concentrations eight to ten times that of seawater, the source of most of North America's magnesium metal, and may have economic potential for magnesium metal extraction by the Dow (electrolytic) process.

Heavy minerals found in trace amounts in the Athabasca Oil Sands are rich in titanium minerals and zircon. They become concentrated in the secondary tailings stream during oil sands processing, to a level where the tailings constitute a potential source of titanium and zirconium metals. Oil sand processing also effects a concentration of vanadium and nickel in the residual bitumen coke. It may become feasible to recover these metals from the coke ash, where the coke is burned as fuel.

Table 2.19 **Principal Statistics of the Mining Industry - Alberta - 1965-1979**

	Establishments No.	Employees	Salaries & Wages ($ 000)	Cost of Fuel & Electricity ($ 000)	Cost of Materials & Supplies ($ 000)	Value of Production ($ 000)	Value Added ($ 000)
1965							
1966							
1967							
1968							
1969							
1970							
1971							
1972							
1973							
1974							
1975							
1976							
1977							
1978							
1979							

Relative Values of Structural Materials and of Non-Metallic Minerals Produced - Alberta - 1951, 1961, 1971, 1981 (millions of dollars)

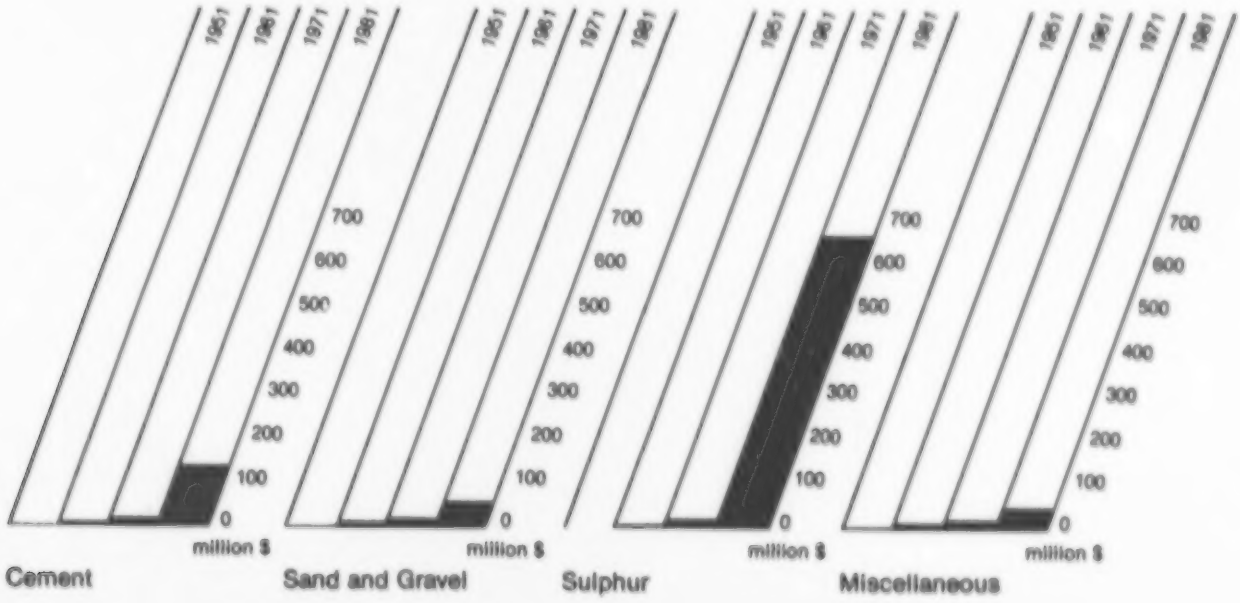


Table 2.20 Volume and Value of Mineral Production - Alberta - Specified Years - 1941-1981

		1941	1951	1961	1971	1980	1981
Fuels							
Coal	'000 Tonnes						18,160
	$ 000						309,400
Natural Gas	'000 000 m³						72,481
	$ 000						8,728,030
Natural Gas By-Products	'000 m³						18,605
	$ 000						2,857,606
Petroleum, Crude	'000 m³						64,476
	$ 000						4,756,022
Structural Materials							
Clay Products	$ 000						14,150
Cement	'000 Tonnes						1,445
	$ 000						
Lime	'000 Tonnes						
	$ 000						
Sand and Gravel*	'000 Tonnes						
	$ 000						
Stone	'000 Tonnes						
	$ 000						
Non-Metallics							
Peat Moss	'000 Tonnes						
	$ 000						
Quartz	$ 000						
Sodium Sulphate	$ 000						
Sulphur Elemental	'000 Tonnes						
	$ 000						
Salt	'000 Tonnes						
	$ 000						
Metals							
Gold	Grams						
	$ 000						
Silver	Grams						
	$ 000						
Total Value	**$ 000**	**41,364**	**168,144**	**496,563**	**1,840,508**	**16,378,970**	**17,571,382**

*Sand and gravel are not legally minerals in Alberta but are part of the surface in accordance with the Sand and Gravel Act 1951.

Table 2.21 Volume of Mineral Production* - Alberta and Canada - 1971 and 1979-1982

	Units	1971		1979		1980		1981	
		Alberta	Canada	Alberta	Canada	Alberta	Canada	Alberta	Canada
Fuels									
Coal	'000 Tonnes								
Natural Gas	'000 000 m³								
Natural Gas By-Products	'000 m³								
Petroleum, Crude	'000 m³								
Non-Metallics									
Peat Moss	'000 Tonnes								
Salt	'000 Tonnes								
Sulphur, Elemental	'000 Tonnes								
Structural Materials									
Cement	'000 Tonnes								
Lime	'000 Tonnes								
Sand & Gravel	'000 Tonnes								
Stone	'000 Tonnes								
Metals									
Gold	'000 g								
Silver	'000 kg								

*Only minerals produced in Alberta are compared with Canada totals.

Table 2.22 Production and Disposition of Sulphur - Alberta - 1971-1981

	Total Produced '000 Tonnes	Total Marketed '000 Tonnes	Gross Value of Sales $ 000	Delivered To							
				Alberta '000 Tonnes	% of Total	Other Provinces '000 Tonnes	% of Total	United States '000 Tonnes	% of Total	Offshore '000 Tonnes	% of Total
1971											
1972											
1973											
1974											
1975											
1976											
1977											
1978											
1979											
1980											
1981											

Construction

The growth of the construction industry reflects the increase in general economic activity in the province. Between 1971 and 1981 the value of construction rose from $1.8 billion to $13.8 billion. The industry has set spending records annually for the past five years due to a rapidly expanding market for office space and residential accommodation and to petroleum-related expansion of industrial installations. Building permit values, a key indicator of construction activity, set a record in 1981. Another indication of activity is in the estimates of the annual average number employed in the industry. In 1971 employment in construction was less than 70,000, by 1981 it had increased to 120,000.

Engineering construction amounts to about 55 per cent of the total value of all construction annually. It tends to predominate largely because of the continuing high proportion of work being done on gas and oil related facilities. Building construction now accounts for 45 per cent with residential construction amounting to 20 per cent of the total value of all construction.

Apart from street, waterworks and sewage system construction, most engineering construction work takes place away from the main population concentrations. Building construction, by dollar volume, is mostly in the vicinity of the cities. Over two-thirds is in or near Calgary and Edmonton.

Construction volumes should not be compared solely on the basis of building permit values. The basic criteria for assigning values to the permits differ both among the issuing authorities and over time. Some municipal authorities do not require or issue permits, and not all types of construction require permits.

Industrial building, in particular, tends to be excluded from permit requirements by definition or practice. Building codes and safety standards, on the other hand, are fairly consistent.

The average number of dwelling starts averaged 37,000 over the ten year period, 1971 - 1981, with a low of 25,600 in 1971 to a high in 1978 of 47,900. High mortgage interest rates contributed to a sharp decline since 1979. The building boom is a reflection of relatively high employment rates and levels of economic activity which have attracted newcomers from other provinces and rural areas.

The rapid growth of the province and inflationary strains on the national economy are very evident in construction data. Dollar figures given in this section have not been adjusted for inflation.

Table 2.23 Value of Construction Work Performed by Principal Type of Construction - Alberta -1971 and 1979-1981

	1971		1979		1980		1981		1982	
		% of Total		% of Total		% of Total		% of Total		% of Total
Building Construction	865	46.9	4,717	50.3	5,034	43.0	6,252	45.2	7,075	42.5
Residential										
Industrial										
Commercial										
Institutional										
Other Building										
Engineering Construction	981	53.1	4,656	49.7	6,660	57.0	7,567	54.8	9,578	57.5
Road, Highway & Aerodrome										
Waterworks & Sewage System										
Dams & Irrigation										
Electric Power										
Railway, Telephone & Telegraph										
Gas & Oil Facilities										
Other Engineering										
Total	1,846	100.0	9,373	100.0	11,694	100.0	13,819	100.0	16,653	100.0

Table 2.24 Dwelling Starts by Month, Urban Centres of 10,000 Population and Over - Alberta - 1971-1981 (number)

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1971	843	1,465	1,188	2,371	2,882	3,218	2,807						
1972	695	1,260	1,444	1,702	2,300	2,871	1,488						
1973	1,071	783	1,309	1,665	1,987	2,548	2,168						
1974	1,128	1,044	1,218	1,648	1,998	2,198	2,121						
1975	687	671	913	1,088	1,430	1,788	1,988						
1976	1,025	2,596	1,986	2,918	2,988	2,109	2,988						
1977	884	1,316	1,288	2,699	2,984	2,988	2,988						
1978	3,088	2,988	2,988	2,193	2,475	2,988	2,988						
1979	3,848	3,082	3,977	3,457	3,799	3,988	3,988						
1980	1,536	1,988	1,988	1,912	1,988	1,988	1,988						
1981	2,193	1,454	1,787	3,017	3,873	3,911	2,988						

Table 2.25 Dwelling Starts, Completions and Under Construction - Alberta and Selected Cities - 1971 and 1976-1981 (units)

	1971	1976	1977	1978	1979	1980	1981
Alberta							
Dwelling Starts	25,602	34,771	36,978	47,988	39,947	36,988	35,478
Completions	20,828	34,988	37,978	44,988	44,988	34,988	34,788
Under Construction at year end	15,338	20,911	27,388	29,988	34,988	36,988	36,988
Edmonton Metro*							
Dwelling Starts	11,988	12,988	12,988	17,008	12,988	11,988	11,988
Completions	8,988	11,988	11,988	11,987	11,988	11,988	11,988
Under Construction at year end	6,988	10,988	10,988	11,725	11,988	11,988	11,988
Edmonton Proper							
Dwelling Starts	9,988	10,988	10,988	14,988	10,988	9,988	9,988
Completions	7,988	9,988	9,988	9,988	9,988	9,988	9,988
Under Construction at year end	5,988	8,988	8,988	9,988	9,988	9,988	9,988
Calgary							
Dwelling Starts	11,988	14,988	14,988	19,988	14,988	14,988	14,988
Completions	9,988	14,988	14,988	14,988	14,988	14,988	14,988
Under Construction at year end	7,988	11,988	11,988	14,988	14,988	14,988	14,988
Camrose							
Dwelling Starts	988	988	988	988	988	988	988
Completions	988	988	988	988	988	988	988
Under Construction at year end	988	988	988	988	988	988	988
Fort McMurray							
Dwelling Starts	988	988	988	988	988	988	988
Completions	988	988	988	988	988	988	988
Under Construction at year end	988	988	988	988	988	988	988

	1971	1976	1977	1978	1979	1980	1981
Grande Prairie							
Dwelling Starts						786	314
Completions						1,010	955
Under Construction at year end						761	93
Lethbridge							
Dwelling Starts						491	1,330
Completions						451	880
Under Construction at year end						423	726
Lloydminster (Alberta Portion)							
Dwelling Starts						298	264
Completions						298	277
Under Construction at year end						189	85
Medicine Hat							
Dwelling Starts							
Completions							
Under Construction at year end							
Red Deer							
Dwelling Starts							
Completions							
Under Construction at year end							
St. Albert							
Dwelling Starts							
Completions							
Under Construction at year end							318

*Edmonton (Metro) includes Fort Jaskatchewan, St. Albert, Morinville, Gibbons, Bon Accord, Legal, Strathcona County No. 20 and Sturgeon M.D.90.

Table 2.26 **Value of Building Permits - Census Divisions and Selected Municipalities - Alberta - 1971 and 1976-1981** (thousands of dollars)

	1971	1976	1977	1978	1979	1980	1981
Census Division 1	5,239	56,933	44,266	57,233	66,450	67,159	71,782
Medicine Hat							
Redcliff							
Census Division 2	22,880	98,883	101,723	97,101	101,445	95,013	123,297
Lethbridge							
Brooks							
Coaldale							
Taber							
Census Division 3	3,706	18,831	17,375	14,002	26,613	15,837	18,820
Cardston							
Claresholm							
Fort Macleod							
Census Division 4	461	3,897	5,125	3,438	6,958	3,179	7,609
Census Division 5	1,925	16,061	22,725	20,918	24,608	23,790	28,316
Drumheller							
Census Division 6	200,254	504,209	868,309	1,132,534	1,232,660	1,561,990	2,602,121
Calgary							
Airdrie							
Cochrane							
Didsbury							
High River							
Okotoks							
Olds							
Census Division 7	1,905	17,201	19,624	19,498	28,508	19,127	18,032
Stettler							
Wainwright							
Census Division 8	15,396	98,836	134,902	173,250	178,387	191,850	220,005
Red Deer							
Innisfail							
Lacombe							
Ponoka							
Rocky Mountain House							
Sylvan Lake							
Census Division 9	5,680	18,806	23,165	24,679	44,434	41,491	68,001
Banff							
Canmore							
Crowsnest							
Jasper							
Census Division 10	7,235	55,888	63,519	99,682	102,725	90,203	73,306
Camrose							
Lloydminster							
Vegreville							
Vermilion							

	1971	1976	1977	1978	1979	1980	1981
Census Division 11	242,121	736,334	838,147	1,084,770	1,115,277	1,675,800	1,512,132
Edmonton (Metro)							1,374,132
Edmonton (Proper)							1,137,555
St. Albert							76,228
Wetaskiwin							16,528
Devon							6,747
Drayton Valley							1,749
Fort Saskatchewan							13,262
Leduc							18,138
Morinville							5,410
Spruce Grove							20,317
Stony Plain							12,602
Census Division 12	9,263	105,019	94,254	105,729	126,493	116,081	150,635
Fort McMurray							
Bonnyville							
Grand Centre							
St. Paul							
Census Division 13	3,148	16,813	21,020	47,198	48,144	40,796	55,893
Barrhead							
Westlock							
Whitecourt*							
Census Division 14	6,635	17,697	37,531	38,495	24,694	35,669	41,062
Edson							
Hinton							
Census Division 15	19,238	65,698	83,139	115,297	227,170	193,041	141,929
Grande Prairie							
Fairview							
Grande Cache							
Peace River							
Slave Lake							
Total Alberta	545,084	1,831,106	2,374,824	3,033,824	3,354,566	4,022,158	5,130,940

Edmonton (Metro) includes Bon Accord, Edmonton, Fort Saskatchewan, Gibbons, Legal, Morinville, St. Albert, Strathcona County No. 20 and Sturgeon M.D. 90.

Table 2.27 Value of Building Permits by Type - Selected Cities - Alberta - 1971 and 1976-1981

(thousands of dollars)

	1971	1976	1977	1978	1979	1980	1981
Alberta							
Residential							
Industrial							
Commercial							
Institutional and Government							
Total	545,084	1,831,106	2,374,824	3,033,824	3,354,566	4,015,037	5,130,940
Edmonton (Metro)*							
Residential							
Industrial							
Commercial							
Institutional and Government							
Total	223,997	618,533	744,143	938,166	985,888	1,441,905	1,374,132
Edmonton (Proper)							
Residential							
Industrial							
Commercial							
Institutional and Government							
Total	166,028	482,711	600,946	723,222	761,723	843,057	1,137,555
Calgary							
Residential							
Industrial							
Commercial							
Institutional and Government							
Total	193,335	447,817	804,061	1,052,743	1,103,037	1,394,374	2,445,479
Lethbridge							
Residential							
Industrial							
Commercial							
Institutional and Government							
Total	18,016	60,244	56,642	56,151	47,277	57,490	89,516
Medicine Hat							
Residential							
Industrial							
Commercial							
Institutional and Government							
Total	3,916	46,700	36,536	44,956	56,979	57,890	57,475
Red Deer							
Residential							
Industrial							
Commercial							
Institutional and Government							
Total	9,264	59,690	81,176	104,452	99,041	116,963	120,594

*Edmonton (Metro) includes Bon Accord, Edmonton, Fort Saskatchewan, Gibbons, Legal, Morinville, St. Albert, Strathcona County No. 20, Sturgeon M.D. 90

Table 2.28 Value of Construction Work Performed by Detailed Type of Construction - Alberta - 1971 and 1977-1982 (millions of dollars)

	1971	1977	1978	1979	1980	1981	1982*
Building Construction	865	2,941	3,831	4,717	5,034	6,252	7,075
Residential							2,849
Non-Residential							4,226
Industrial							434
Factories, Plants, Workshops	45	117	185	191	222	324	386
Other	6	10	23	11	20	34	48
Commercial							2,553
Warehouses, Storehouses, etc.	10	116	68	178	164	199	231
Office Buildings	41	256	414	604	858	1,197	1,486
Retail and Wholesale	44	78	127	326	291	452	490
Other	28	140	168	242	267	270	346
Institutional							825
Schools and Other Educational Buildings	107	61	92	138	152	273	324
Hospitals, Sanitoria, Clinics, etc.	17	50	83	103	232	237	369
Other	13	38	47	50	78	96	132
Other Building							
Farm Buildings (excluding dwellings)	43	117	112	139	171	217	223
Other	18	125	85	90	101	148	192
Engineering Construction	981	3,184	3,579	4,856	6,660	7,567	9,578
Marine Construction							
Roads, Highways and Aerodromes							
Streets, Highways, Parking Lots, etc.	137	345	412	493	565	721	755
Other, Including Aerodrome	6	13	12	18	17	17	25
Waterworks and Sewage Systems							
Water Mains, Hydrants and Services	17	51	69	69	87	116	126
Sewage Systems and Connections	12	47	63	65	82	94	164
Other	17	69	76	101	113	151	212
Dams and Irrigation							
Electric Power Construction							
Generating Plants, Including Water Control	45	179	139	173	324	171	266
Transmission, Distribution and Trolley Lines	36	103	123	124	176	300	297
Other	1	4	6	3	5	9	9
Railway, Telephone and Telegraph							158
Railway Tracks and Road Beds	35	69	36	109	102	102	269
Other	26	68	120	112	111	108	189

	1971	1977	1978	1979	1980	1981	1982*
Gas and Oil Facilities							
Gas Mains and Services	10	32	41	48	58	81	109
Oil and Gas Pipe Lines	49	10	24	91	223	549	700
Oil and Gas Wells	278	1,309	1,847	2,661	3,892	3,889	4,638
Natural Gas Processing Plants	198	205	229	274	274	353	561
Other	28	35	12	18	44	163	200
Other Engineering							
Bridges, Trestles, Culverts, Viaducts	22	28	60	70	85	88	100
Other	51	522	275	168	356	486	779
Total Construction	1,846	6,125	7,410	9,373	11,693	13,819	16,653
Salaries and Wages							
Cost of Materials Used							
Number of Employees ('000)							

*Forecast

Forestry

Sixty per cent of Alberta is covered by forest, constituting an approximate area of 390,000 square kilometres. The forests contain nearly 1.7 billion cubic metres of wood material. Alberta ranks fourth among Canadian provinces both in terms of merchantable timber volume and productive forest area.

Of the forest area, approximately 164,000 square kilometres are classified as timbered with a further 72,000 square kilometres regarded as suitable for timber after they have been restocked. An area of 154,000 square kilometres is classified as unsuitable terrain; it includes muskeg and bushland areas. The major portion of the forest land is in the Boreal Forest Region. There are also Subalpine and Montane Forest Regions on the eastern slopes of the Rocky Mountains.

Of the 164,000 square kilometres of timbered forest land, approximately 41 per cent is covered with coniferous, 27 per cent with deciduous, and 32 per cent with mixed coniferous and deciduous trees. Spruce, pine, fir, poplar, and birch are the predominant species.

Forest-based industries account for approximately 12 per cent of the value of manufactured goods in the province. Coniferous timber quota operations have an authorized annual allowable cut of approximately 3 million cubic metres primarily for the production of lumber, plywood, and round timbers. In addition, Forest Management Agreements have been established allowing an annual cut of about 3.4 million cubic metres of stacked pulpwood and 700,000 cubic metres of sawlog. There is room for expanded forest production, including major pulpmills and sawmilling facilities, while maintaining the net volume of timber growth. The present annual cut of trees is in the order of 6 million cubic metres coniferous, and 50,000 cubic metres deciduous; the potential annual yield is over 14 million cubic metres coniferous, and over 13 million cubic metres deciduous.

Over the past two decades, there has been a significant change in the proportions of forestry production. Prior to 1956, lumber manufacture accounted for 85 per cent by volume of total forest production. Lumber now accounts for about 60 per cent of the total, due to an increase in the production of pulpwood and round timber. This shift was partly caused by the commencement of operations of large pulp mills at Hinton in 1956 and near Grande Prairie in 1973.

The large new capital facilities being built reflect the increasing modernization of the Alberta forest industry and are considered a mainstay for the maintenance of a favourable competitive position in world lumber markets.

A vital aspect of forest management is that of reforestation. With the implementation of a sustained yield policy, the task of reforestation was taken on by government and the timber industry. Regeneration requirements are set and surveys regularly conducted on harvested areas. Minimum stocking standards are enforced. To cope with the increasing demands exerted by the reforestation program and its increasing complexity, a Reforestation and Reclamation Branch was formed within the Alberta Forest Service in 1977 to concentrate on the operational aspects of these activities.

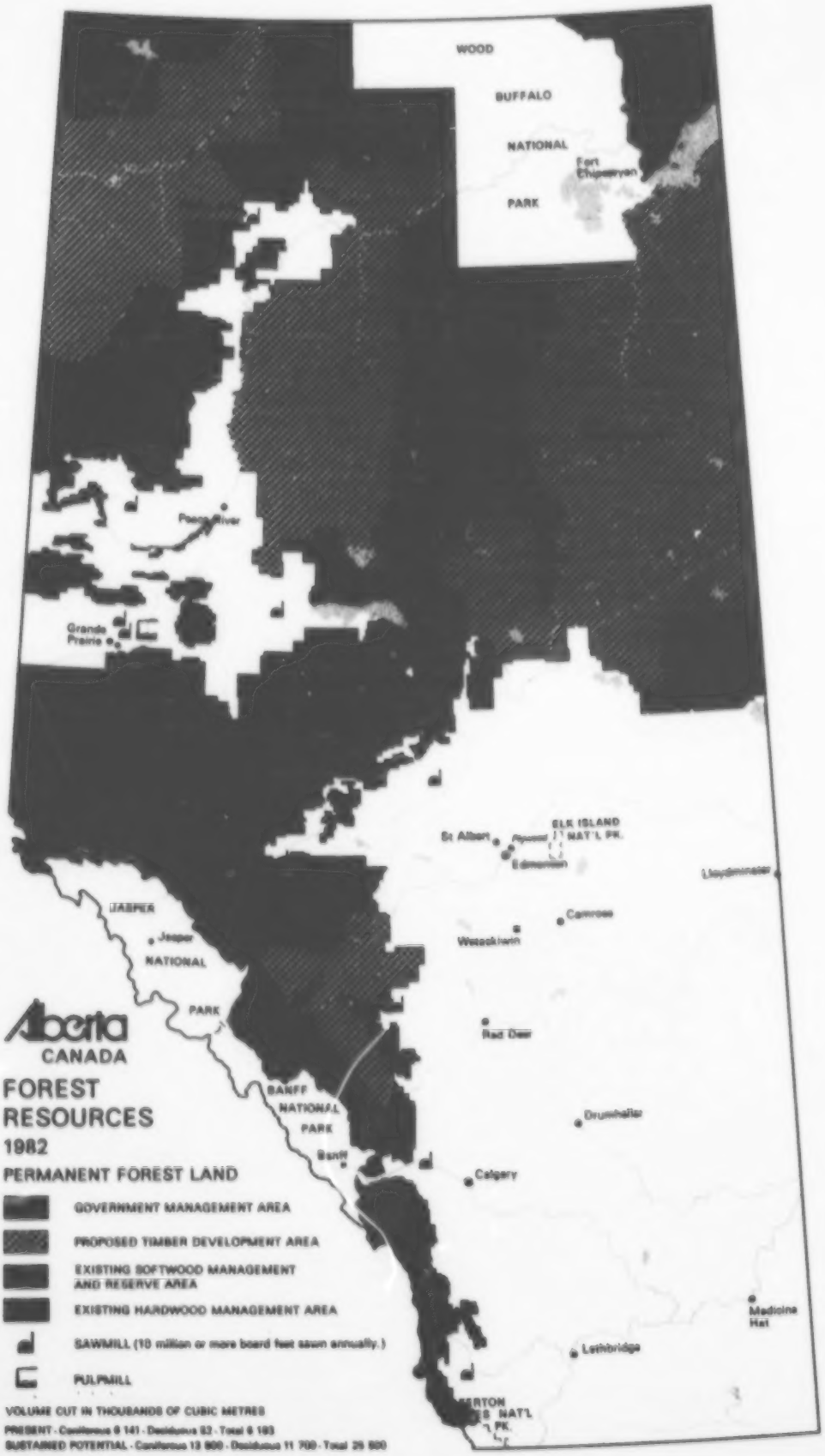
The Pine Ridge Forest Nursery, constructed through funding from the Alberta Heritage Savings Trust Fund, will ultimately supply ten million bareroot and ten million container stock annually for Alberta industry and government reforestation and afforestation programs. The facility is projected to sustain an adequate supply of seedlings for these programs for at least the next decade.

The Crown is Alberta's principal landowner. Except for carefully selected areas which are suitable for agriculture, the provincial government retains title to these lands and only grants rights (such as mineral or timber) to the private sector under specified terms and conditions. Timber harvesting authorization is obtained by acquiring a Forest Management Agreement, Timber Quota or Timber Permit.

About 331,000 square kilometres of forest area are now subdivided into over 100 Forest Management Units in ten Forest Administration Regions. Based on current inventories (together with recognition of multiple forest uses), an annual allowable cut and cut progression schedule is developed under a timber management plan for each management unit to ensure a sustained supply of forest products from that unit.

Prospective Forest Management Areas, called Timber Development Areas, are publicly advertised and company development proposals invited. Company representatives are required to outline their proposals at public hearings to assure those present that sound forest management practices will be followed and that environmental and social factors will be considered. The selection of the successful company is made by the Executive Council of the Province of Alberta.

The Alberta Forest Service then negotiates a Forest Management Agreement with the company, with terms and conditions based primarily on the company submission made at the public hearings. Such an Agreement is entered into when the applicant agrees to construct a pulpmill, plywood plant or some other capital facility. Each Agreement provides the holder with harvesting rights over extensive areas of commercial timber at specified dues, rates, and under specific conditions. The land within a Forest Management Area must be managed


WOOD
BUFFALO
NATIONAL
PARK
Fort Chipewyan
Peace River
Grande Prairie
St Albert
Edmonton
ELK ISLAND NAT'L PK.
Lloydminster
JASPER
Jasper
NATIONAL
PARK
Camrose
Wetaskiwin
Red Deer
BANFF
NATIONAL
PARK
Banff
Drumheller
Calgary
Medicine Hat
Lethbridge
Alberta
CANADA
FOREST
RESOURCES
1982
PERMANENT FOREST LAND
GOVERNMENT MANAGEMENT AREA
PROPOSED TIMBER DEVELOPMENT AREA
EXISTING SOFTWOOD MANAGEMENT AND RESERVE AREA
EXISTING HARDWOOD MANAGEMENT AREA
SAWMILL (10 million or more board feet sawn annually.)
PULPMILL
VOLUME CUT IN THOUSANDS OF CUBIC METRES
PRESENT - Coniferous 6 141 - Deciduous 52 - Total 6 193
SUSTAINED POTENTIAL - Coniferous 13 800 - Deciduous 11 700 - Total 25 500
Produced by the Alberta Bureau of Surveying and Mapping © 1982

on a sustained yield basis to ensure continued production. All Agreements require the holder to conduct inventories, develop management and annual operating plans, and reforest all cutover areas. The Forest Management Agreement negotiated with the company is then approved by Cabinet.

Most other commercial timber operations are conducted under the authority of timber quotas. Where timber is available for harvesting, a quota may be authorized and offered for competitive sale at public auction. In order to provide security of tenure, quotas are generally established for twenty-year periods with the volume of production regulated over five-year periods. Actual harvesting is authorized by issuance of successive timber licences. A licence is issued once a quota holder has submitted his performance deposit, paid assessed fees and costs associated with establishment of the quota and licensing, and complied with all regulations.

Commercial Timber Permits (C.T.P.'s) may be offered by competitive auction sale where a surplus annual allowable cut is present or has accumulated (usually as a result of an undercut by a quota holder) in a management unit. When there is reason to require prompt removal of timber if it is dead, diseased, damaged, or is in a development or research area, a C.T.P. may be issued without competition. Generally, C.T.P.'s are held by small operators not desiring or unable to obtain a quota in a Forest Management Unit. These permits are issued for a short term, usually one to three years.

Local Timber Permits (L.T.P.'s) were primarily established to provide local residents with the opportunity to harvest timber for their own use, or for sale, if approved for the particular Forest Management Unit. Volume of timber harvested is limited and permits are restricted to a one-year term.

These forest policies are designed to ensure that Alberta will have a viable forest industry over the long term. They reflect a determination to maintain the benefits that accrue to the province from the natural beauty, wildlife, and recreational potential of the forests.

WOOD
BUFFALO
NATIONAL
PARK
JASPER
NATIONAL
PARK
BANFF
NATL.
PARK
BOW-
CROW
FOREST
C 755
D 110
WATERTON LAKES
NATIONAL PARK
Alberta
CANADA
POTENTIAL ANNUAL
FOREST YIELD
1980
C 1 280 CONIFEROUS VOLUME IN THOUSANDS OF CUBIC METRES PER YEAR
D 510 DECIDUOUS VOLUME IN THOUSANDS OF CUBIC METRES PER YEAR
Produced by the Alberta Bureau of Surveying and Mapping © 1982

Table 2.29 Area - Crown and Private Land - Alberta - 1981

	km²	Per Cent
Crown Land		73
Federal (National Parks, Department of National Defence)		10
Provincial (Parks, Wilderness Areas non-settled public lands)		63
Private Lands		27
Provincial Total	661,185	100

Table 2.30 Managed Forest Lands, by Forest - Alberta - 1982

Forest	Area in Managed Forest Land (km²)	Per Cent of Total Area of Managed Forest Land
Athabasca		16
Bow/Crow		4
Clearwater/Rocky		8
Edson		8
Footner Lake		12
Grande Prairie		8
Lac La Biche		6
Peace River		13
Slave Lake		20
Whitecourt		5
Total	330,880	100

Table 2.31 Timber Volumes by Species - Alberta

Species	Diameter (cm)	Volume ($10^6 m^3$)	Per Cent
Coniferous:			
Spruce, White			11
Spruce, White			1
Pine, Jack & Lodgepole			8
Pine, Jack & Lodgepole			8
Spruce, Black			4
Fir, Balsam			2
Deciduous:			
Poplar and Birch			40
Total		1,690.5	100

Table 2.32 Forest Production by Volume and Value on Crown Lands - Alberta - 1981-1982

Product	Units	Volume	Value ($)
Lumber & Plywood Logs			
coniferous			
deciduous			
Round Timber			
Pulpwood			
Wood Chips			
Fuelwood			
Slabs			
Railway Ties			
Lath			
Sub Total		7,384,162	250,935,934
Christmas Trees			
Trees for Transplanting			
Total			251,202,252

*Above figures do not include 2,641 m³ of lumber cut by Metis Colonies and 60,103 m³ of lumber harvested in Federal Parks

Table 2.33 Annual Volume of Timber Production on Crown Lands, by Type of Product - Alberta - Fiscal Years 1972-1981 (thousands of cubic metres)

	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82
Lumber*										
coniferous										
deciduous										
Round Timber										
Pulpwood										
Fuelwood										
Railway Ties										
Woodchips										
Total	4,642	6,031	4,803	4,741	5,386	6,038	6,193	6,542	6,634	7,385

*Includes plywood and lath volumes

Table 2.34 Reforestation Activity, Alberta Forest Service (AFS) and Alberta Forest Industry (AFI) Firms - Alberta - 1971/72-1980/81

Year		Area Scarified (hectares)	Area Seeded (hectares)	Area Thinned (hectares)	Seed Extracted (kg)	Seedlings Planted	
						Conventional* ('000)	Container ('000)
1971-72	AFS						513
	AFI						644
1972-73	AFS						1,127
	AFI						929
1973-74	AFS						1,335
	AFI						958
1974-75	AFS						1,224
	AFI						3,124
1975-76	AFS						3,515
	AFI						1,733
1976-77	AFS						2,360
	AFI						4,286
1977-78	AFS						2,956
	AFI						4,304
1978-79	AFS						3,567
	AFI						6,185
1979-80	AFS						2,804
	AFI						5,430
1980-81	AFS						2,764
	AFI						6,774

*Includes wildings

Commercial Fishing

Although Alberta has 228 lakes in which commercial fishing is permitted, only about 100 are fished during a given year. The remaining lakes are either too small, located in remote areas, or are not sufficiently productive to be of interest to commercial fishermen. However, they may be opened to exploitation as economics warrant.

The province is divided into eight commercial fishing zones. The main purpose is to restrict numbers of licencees on any given lake to avoid overcrowding by fishermen and also to avoid exceeding the established fish catch on individual lakes. Approximately 1,900 licences are issued annually.

The main target species, in order of importance, are whitefish, walleye, northern pike, perch and tullibee. Lake trout are harvested in very limited numbers, due to their very limited supply in the province generally and the high demand for them by sports anglers. In terms of value per pound, walleye ranks first, followed by whitefish, perch, northern pike and tullibee.

In addition to the main target species, several kinds, often referred to as "rough" fish, are taken incidentally. These are burbot, mullets (suckers), and non-export grade tullibee. Most of the tullibee in this category are sold as mink food, but no significant market exists for mullets and burbot.

Six registered fish packing plants are located in Edmonton, Cold Lake, Lac La Biche, Faust, Joussard and Tilley. Fish are delivered to the plants by commercial fishermen for processing and shipment to market. The plants are inspected periodically by provincial and federal authorities to ensure that proper handling and care procedures are followed.

All fish caught commercially, except those which are sold by fishermen directly to consumers, are marketed through the Freshwater Fish Marketing Corporation. Approximately 500,000 kilograms annually are sold directly to consumers. Over 80 per cent of the fish handled by the corporation is destined for export markets.

Table 2.35 **Fisheries Production - Alberta - 1961-1982**

	Tonnes	($ 000)		Tonnes	($ 000)
1961	7,584	2,179	1972	2,625	1,411
1962	4,202	1,416	1973	2,204	1,478
1963	4,100	1,141	1974	2,092	1,434
1964	4,037	1,174	1975	2,376	1,754
1965	5,578	1,243	1976	1,948	1,605
1966	4,034	1,188	1977	1,365	2,165
1967	4,766	1,397	1978	2,119	2,170
1968	4,735	1,560	1979	2,693	3,374
1969	5,437	1,486	1980	2,014	2,918
1970	4,902	1,728	1981	2,486	3,328
1971	3,128	1,588	1982	2,245	3,213

Trapping

Trapping has long been an integral part and desirable tool of wildlife management as well as an intrinsic part of Canadian heritage. Many Albertans are still dependent upon the wild fur industry for their livelihood, for either a sole or supplementary income. Throughout the settled parts of Alberta, the trapping of wild fur provides an additional income for the part-time trapper as well as serving as a means of removal or control of problem wildlife species.

Wild fur production has remained fairly stable over the years. From time to time, increases in numbers and species of animals harvested indicate increasing or peaking population levels of these species. In Alberta, no species of fur-bearing animal is in danger of extinction by trapping. Changing demands by the public and the manufacturing and design industries cause corresponding changes in the value of furs. Changing trends in fashion requirements must be catered to by fur dealers, fur auctions and brokers.

During the 1981-82 season there were 2,948 registered trappers actively engaged in trapping on Crown land. Resident trappers purchased 5,680 licences to trap on small parcels of privately owned land. During the 1980 season the total value of raw fur harvested amounted to $15.6 million, a peak year, but declined to $9.8 million in the 1982 season.

Table 2.36 **Fur Production and Value of Fur Pelts - Alberta - 1960-1982**

	Number	($'000)		Number	($'000)
1960			1972		$ 3,780
1961			1973		$ 8,383
1962			1974		$ 4,826
1963			1975		$ 3,230
1964			1976		$ 2,371
1965			1977		
1966			1978		
1967			1979		
1968			1980		
1969			1981		
1970			1982		$ 9,774
1971					

Tourism

Tourism is an important industry in Alberta, contributing numerous economic and social benefits. These include business investment opportunities, employment for large numbers of people, and the provision of a variety of recreational and cultural amenities to be enjoyed by residents and visitors.

The tourist industry is comprised of a host of businesses, large and small, which serve the needs of the travelling public. Airlines, hotels, restaurants, taxicabs, ski resorts, gas stations, grocery stores — these are just a few of the businesses that make up the industry. As an indication of the number of businesses involved in Alberta, in 1982 there were about 1,100 hotels and motels, and 5,000 food service outlets and gas stations. When the full range of businesses which serve the tourist is considered, the size and diversity of the industry can be appreciated.

Because it involves so many businesses throughout the province, tourism plays a major role in the Alberta economy. In 1981 it is estimated the industry generated about $1.34 billion in revenues and employed close to 60,000 people. The revenue figure is more than triple that of 1971 when revenues were $374 million. For the decade, revenues grew at an average rate of 14 per cent annually.

Albertans, as might be expected, are the single largest market component, accounting in 1981 for about 59 per cent of total tourist revenues and 76 per cent of total tourist visits. Residents of other Canadian provinces accounted for 24 per cent of total revenues and 15.5 per cent of total visits; U.S. residents, for 11 per cent of revenues and 6.7 per cent of total visits, and other foreign visitors, mainly from western Europe, for the remaining 6 per cent of revenues and 2 per cent of visits.

Tourism in Alberta has prospered over the last decade, along with most other sectors of the economy. Growing markets (particularly the Alberta resident market), rising incomes, and an increasing focus on Alberta both nationally and internationally, all contributed to growth in the tourism industry. Other important factors in this growth have been the development of new tourist attractions and facilities in the province and a greatly improved transportation system (highways and air) that has come with Alberta's economic boom.

Alberta offers a multitude of things for the visitor to see and do. Some of the more important attractions are the spectacular Rocky Mountains, which in the winter offer world-class skiing; the World Heritage site Dinosaur Provincial Park; the Drumheller badlands; the Columbia Ice Fields' glacier; the beauty and solitude of Alberta's north country with its excellent fishing; and Canada's fastest-growing cosmopolitan centres, Calgary and Edmonton. In addition, there are hundreds of annual and special events: Edmonton's Klondike Days, the Calgary Stampede, Banff's Festival of the Arts, and countless community celebrations like rodeos and harvest fairs. For the vacationer with a sense of adventure, Alberta offers almost everything: trailrides on horseback, fly-in fishing at remote lakes, river rafting, mountain climbing, even winter dogsled tours.

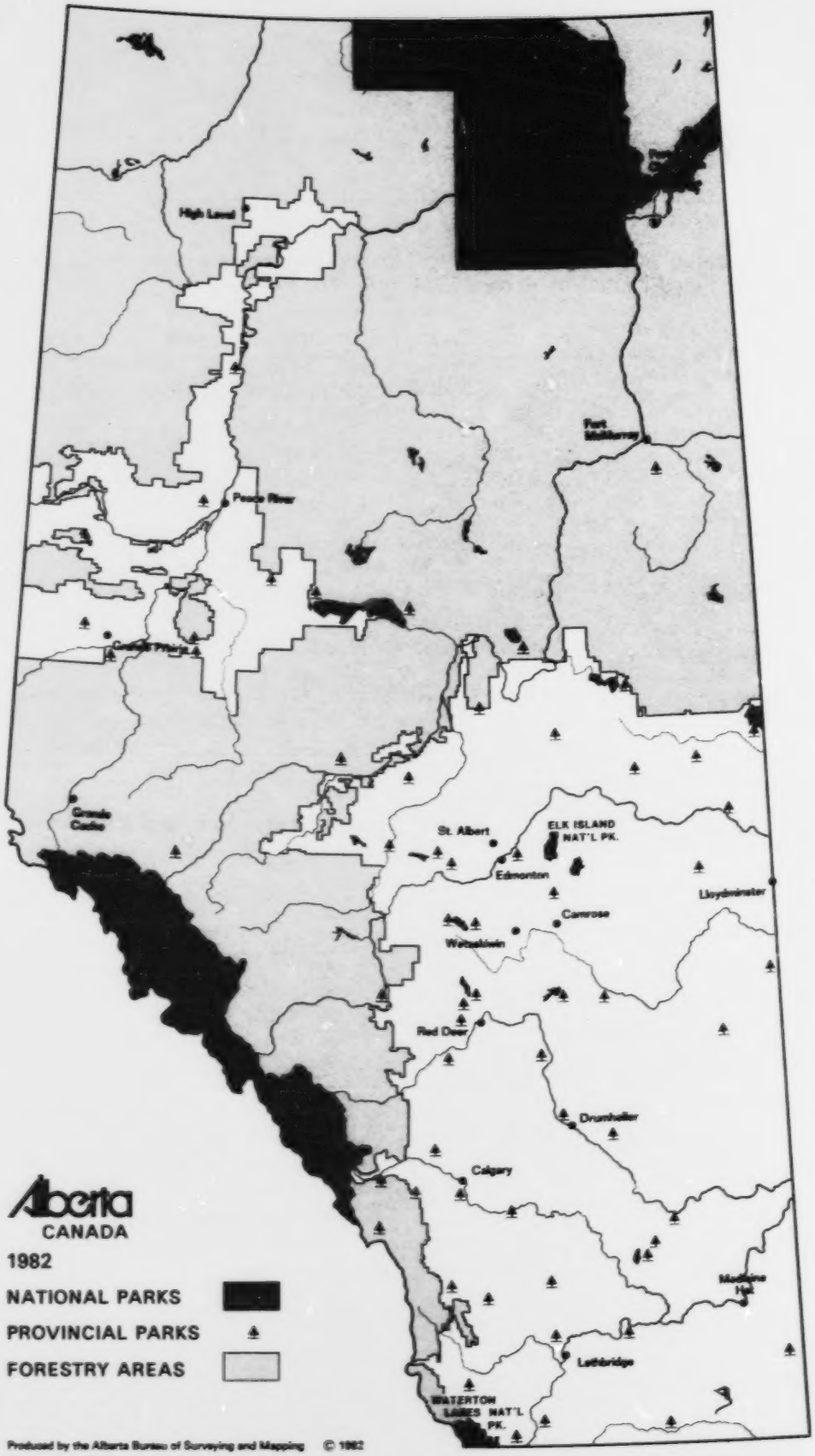

High Level
Fort McMurray
Peace River
Grande Prairie
Grande Cache
St. Albert
ELK ISLAND NAT'L PK.
Edmonton
Lloydminster
Camrose
Wetaskiwin
Red Deer
Drumheller
Calgary
Medicine Hat
Lethbridge
WATERTON LAKES NAT'L PK.
Alberta
CANADA
1982
NATIONAL PARKS
PROVINCIAL PARKS
FORESTRY AREAS
Produced by the Alberta Bureau of Surveying and Mapping © 1982

Table 2.37 Persons and Vehicles Entering Through Canada Customs Ports, and Visitors to National Parks - Alberta - 1971 and 1976-1981 (number)

	1971	1976	1977	1978	1979	1980	1981
U.S. Vehicles Entering Through Alberta/USA Border Points	N/A	194,056	153,280	134,184	115,892	129,540	139,043
Persons Entering Through Canada Customs Ports in Alberta							
United States Visitors	497,198	549,475	477,230	447,947	418,080	451,881	485,671
Overseas Visitors	20,945	55,724	62,655	79,199	97,600	95,321	104,515
Canadian Residents Returning:							
From the U.S.	406,500	720,658	729,049	707,926	740,906	826,360	817,494
From the Overseas	—	52,950	71,506	76,106	84,774	80,335	78,749
Traffic Counts for National Parks							
Banff	2,498,410	3,163,716	3,003,807	3,126,797	3,506,306	3,849,124	3,913,285
Jasper	1,408,340	1,822,332	1,699,368	1,797,885	1,910,276	1,909,100	1,971,905
Waterton	559,330	478,408	541,547	657,770	683,494	667,008	642,173
Elk Island	313,557	328,697	401,136	409,063	382,084	419,802	495,070
Wood Buffalo	—	—	—	—	—	—	1,793
Total	4,779,687	5,593,148	5,632,858	5,994,325	6,370,160	6,665,095	7,025,126

Table 2.38 Estimated Tourism Receipts from Resident and Non-Resident Travel - Alberta - 1971-1981 (millions of dollars)

	Alberta Travellers	Other Canadian Travellers	U.S.A. Travellers	Overseas Travellers	Total Receipts	Growth over Previous Year (%)
1971	224	85	60	6	374	—
1972	248	94	66	7	415	+10.8
1973	282	112	75	10	479	+15.4
1974	324	134	88	17	563	+17.5
1975	402	153	85	24	664	+17.9
1976	485	177	98	27	787	+18.5
1977	510	188	92	27	817	+3.8
1978	576	215	99	41	932	+14.0
1979	630	248	98	56	1,032	+10.7
1980	726	288	109	63	1,177	+14.1
1981	837	324	1,182	66	1,349	+14.7

Energy Resources

Energy Resources

Alberta has been accurately described as Canada's energy province. Large areas are underlain by thick beds of ancient sedimentary rocks which contain deposits of oil, natural gas, bitumen, and coal. In addition, swift rivers flowing to the Arctic Ocean as well as eastward to the Hudson Bay, have substantial potential as sources of hydroelectric energy. This section presents details of the status of development of these important resources.

In recent decades conventional crude oil and natural gas have been the most significant sources of fossil fuel energy. Coal and the oil sands, however, comprise by far the largest potential sources. In terms of heating value, Alberta's remaining established reserves of fossil fuels in 1981 comprised the equivalent of 527 million terajoules.

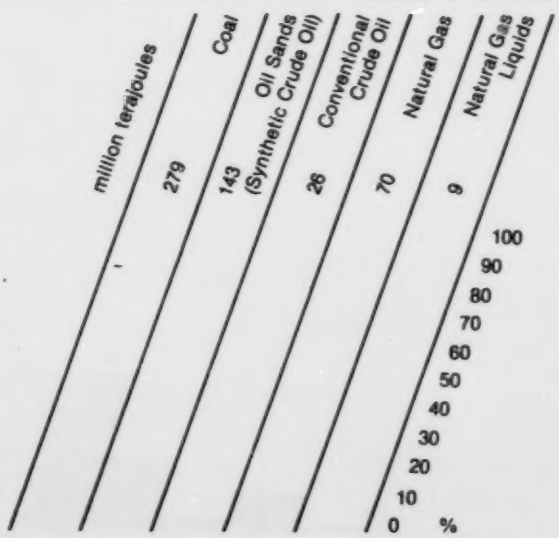
The Energy Resources Conservation Board estimates the ultimate potential of fossil fuels in Alberta (those already proved plus those believed to exist but not yet discovered) will total the equivalent of 15.3 billion terajoules.

Remaining established reserves of conventional crude oil in Alberta comprised some 67 per cent of the Canadian total at year end 1981. This is an apparent decline from the 81 per cent recognized in 1980 because oil reserves for the east coast offshore fields were included in the Canadian total for the first time in 1981. Remaining established reserves of natural gas comprised 70 per cent of Canadian reserves. There is no question but that these resources are of substantial importance to both Alberta and Canada.

Growing interest is being shown in coal and oil sands reserves because of recent increases in international crude oil prices, and because of the probability of not meeting future Canadian energy requirements from domestic conventional petroleum sources in the short-term. Alberta's coal reserves are not as easily defined as reserves of crude oil and natural gas, but they comprise the largest source of fossil-fuel energy by a wide margin. The development of oil sands has received world-wide attention. Major commercial oil sands plants to extract oil from the sands began operations in 1967 and 1978, and an expansion of the first plant is scheduled to begin in 1983.

In addition to its fossil fuel reserves, Alberta also has a significant reserve of non-depleting hydro energy. The ultimately developable hydroelectric energy potential is estimated to be some 60,000 gigawatt hours a year, equivalent over a 30-year period to a thermal energy content of 67 million terajoules. The major portion of this potential reserve is contained in the flowing waters of the Athabasca, Peace, and Slave Rivers. To date, only about three per cent of the total hydro reserves have been developed, entirely on the Bow and North Saskatchewan River systems. In 1981, some 14.5 per cent of Alberta's electrical generating capacity was based on hydro development and generated some nine per cent of the electric energy required.

Confirmed Reserves of Fossil Fuels -Alberta



Estimated Ultimate Potential Reserves of Fossil Fuels - Alberta

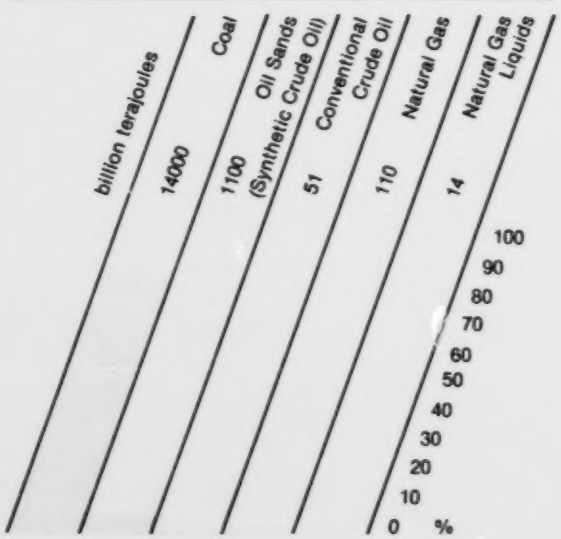
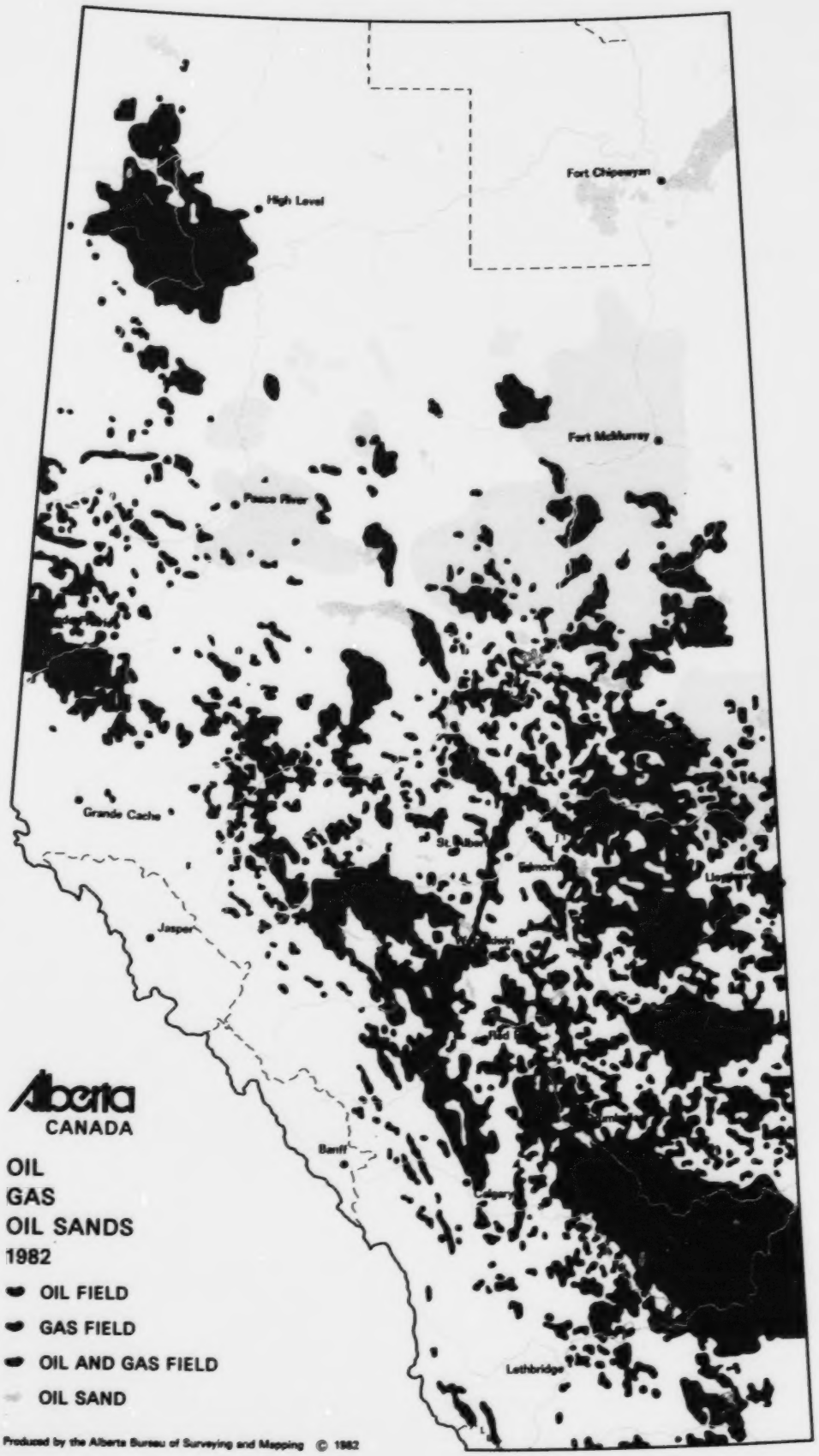


Table 3.1 **Remaining Established Reserves of Fossil Fuels - Alberta - (Estimated as at Year End 1981)**

Fuel	Type	Unit of Measure	Quantity in Units of Measure	Average Heating Value Per Unit (gigajoules)	Heating Value Equivalent (joules)	Per Cent of Total
Coal	Subbituminous	tonne	13.100×10^9	16.5000		
	Bituminous					
	— Low — Medium Volatile	tonne	1.700×10^9	27.0000	279×10^{18}	53.0
	— High Volatile	tonne	0.900×10^9	21.0000		
Synthetic Crude Oil (Oil Sands)		cubic metre	3.850×10^9	36.5000	143×10^{18}	27.1
Conventional Crude Oil		cubic metre	0.696×10^9	38.8000	26×10^{18}	4.9
Natural Gas		cubic metre	1795.000×10^9	0.0374	70×10^{18}	13.3
Natural Gas Liquids		cubic metre	0.321×10^9	29.3000	9×10^{18}	1.7
Total					**527×10^{18}** (527 million terajoules)	**100.0**

Table 3.2 **Estimated Remaining Ultimate Potential Reserves of Fossil Fuels - Alberta - (Estimated as at Year End 1981)**

Fuel	Type	Unit of Measure	Quantity in Units of Measure	Average Heating Value Per Unit (gigajoules)	Heating Value Equivalent (joules)	Per Cent of Total
Coal	Subbituminous	tonne	822.000×10^9	16.5000		
	Bituminous					
	— Low — Medium Volatile	tonne	4.700×10^9	27.0000	$14{,}000 \times 10^{18}$	91.7
	— High Volatile	tonne	2.900×10^9	21.0000		
Synthetic Crude Oil (Oil Sands)		cubic metre	30.000×10^9	36.5000	$1{,}100 \times 10^{18}$	7.2
Conventional Crude Oil		cubic metre	1.400×10^9	38.8000	51×10^{18}	0.3
Natural Gas		cubic metre	2800.000×10^9	0.0374	110×10^{18}	0.7
Natural Gas Liquids		cubic metre	0.496×10^9	29.3000	14×10^{18}	0.1
Total					**$15{,}275 \times 10^{18}$** (15.3 billion terajoules)	**100.0**


Fort Chipewyan
High Level
Fort McMurray
Peace River
Grande Cache
Jasper
Banff
Lethbridge
Alberta
CANADA
OIL
GAS
OIL SANDS
1982
OIL FIELD
GAS FIELD
OIL AND GAS FIELD
OIL SAND
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Petroleum and Natural Gas

Since the early part of this century the oil and gas industry has been a prime factor in Alberta's economic growth.

The first commercial gas well in Alberta was drilled at Medicine Hat in 1890, and the first commercial natural gas liquids production began in the Turner Valley area in 1914. Heavy crude oil was first commercially extracted near Wainwright in 1925, and important discoveries of heavy oil were made later at Vermilion and Lloydminster. In 1932, a major discovery of light crude oil was made in the Turner Valley gas field.

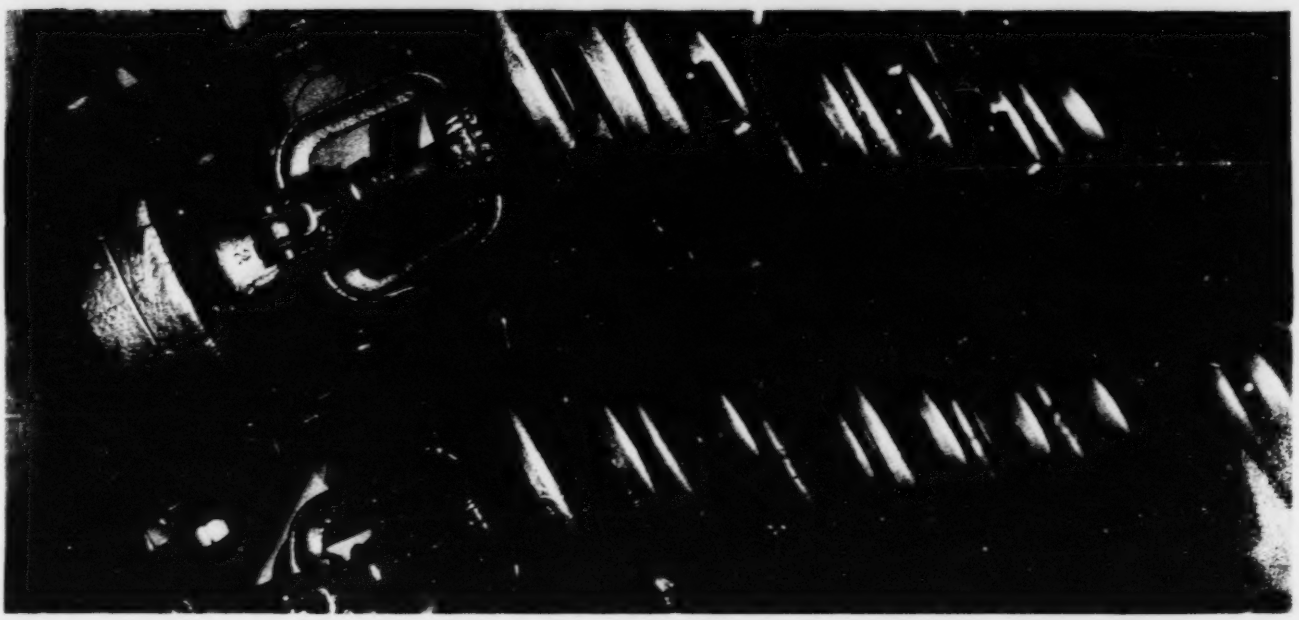
Turner Valley subsequently developed into a major area of oil and gas production, and Calgary emerged as the principal location for the Canadian petroleum industry. The discovery of oil near Leduc in 1947 launched modern oil and gas development.

The Petroleum and Natural Gas Conservation Board was established in 1938 to enforce conservation measures and eliminate the wasteful flaring of natural gas occurring in the Turner Valley field. Now called the Energy Resources Conservation Board, it remains a regulatory body that administers legislation governing provincial exploration and development, pipelines, environmental management, prevention of waste, energy requirements and exports to markets outside Alberta.

Oil and gas pipelines in Alberta extend to the east, south, and west supplying central Canada, part of British Columbia, and a substantial portion of the U.S. with petroleum liquids and natural gas. The Interprovincial Pipeline was completed in 1950 to transport crude oil from Edmonton to Superior, Wisconsin. It was extended to Sarnia, Ontario in 1953; to Toronto, Ontario in 1957; and to Montreal, Quebec in 1976. The TransCanada Pipeline was completed in 1958 and now supplies gas markets as far east as Montreal. The TransMountain Pipeline and the Westcoast Transmission Pipeline were completed in 1953 and 1957 respectively, to supply oil and gas to the west coast region of Canada.

The TransMountain Pipeline was extended in 1955 to supply oil to the Puget Sound area of the northwestern U.S. The Westcoast line transports gas mainly to British Columbia and the northwestern U.S. By 1961, the Alberta Gas Trunk Line Company Limited was also exporting gas south to the northwestern U.S. and California via the Crowsnest Pass and connecting pipelines. The movements of oil and gas within, to, and from Canada are illustrated on the accompanying maps.

Today, Alberta is the major force in Canada's oil and gas industry. In 1981, Alberta supplied 189,500 cubic metres a day, or 85 per cent of Canada's requirements of crude oil and equivalent (conventional, synthetic and experimental crude oil, condensate and pentanes plus). About 67 per cent of Alberta's 1981 production of crude oil and



equivalent was delivered to other Canadian provinces, while the U.S. received 10 per cent. Daily exports by Canada to the U.S. averaged 25,700 cubic metres of crude oil and equivalent, while Canadian imports averaged 80,900 cubic metres per day.

Although production of conventional crude oil was down in 1981, it again outstripped additions to reserves. Remaining established reserves, estimated at 696 million cubic metres, declined for the twelfth consecutive year. Alberta reserves of conventional crude oil constitute approximately 67 per cent of Canadian reserves. If production were to continue at 1981 rates of 57 million cubic metres a year, Alberta's existing conventional crude oil supply would be exhausted in approximately 12.2 years. The Energy Resources Conservation Board's estimates of Alberta's liquid hydrocarbon reserves, and the Canadian Petroleum Association estimates for other provinces are shown in an accompanying table.

Exploration activity in 1981 declined from the record levels established in 1980, although some areas continued to attract considerable exploration and promising oil discoveries were made. Exploration drilling resulted in 2,330 wells, down 11 per cent, and development drilling resulted in 3,504 wells, a decline of 21 per cent below 1980. This decline was primarily due to reduced drilling of natural gas wells, as a result of uncertainty in U.S. export markets and of high interest rates. Exploration and development expenditures were down slightly in 1981 to $1.90 billion.

The Energy Resources Conservation Board estimates that Alberta's remaining established reserves of marketable gas at the end of 1981 are 1,795 billion cubic metres; remaining established reserves of natural gas liquids and sulphur are estimated at 321.2 million cubic metres and 119.3 million tonnes, respectively.

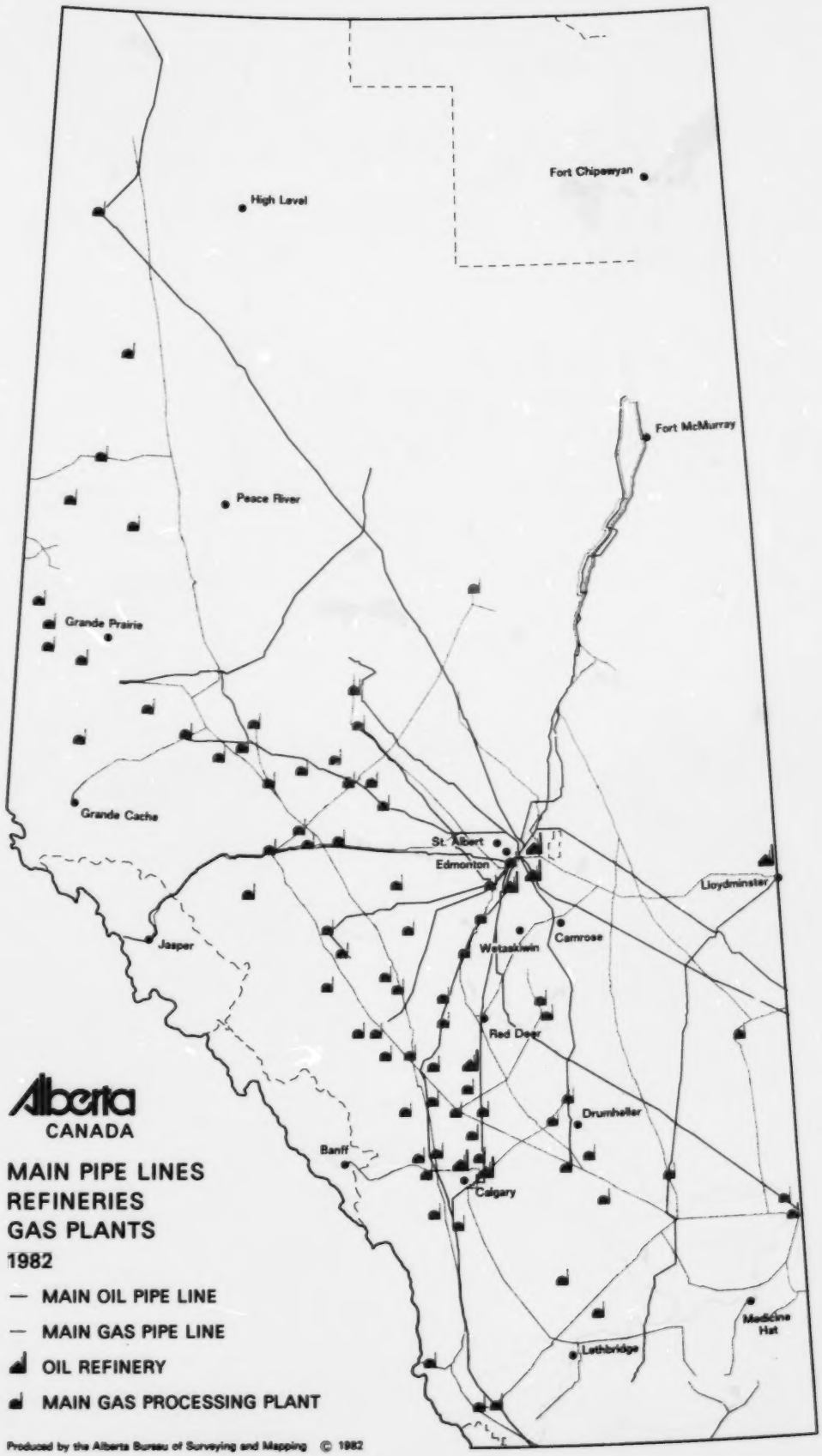
Approximately 30 per cent of the 62 billion cubic metres of marketable gas produced in 1981 was exported to the U.S., while 43 per cent of Alberta's gas was sold to other provinces.

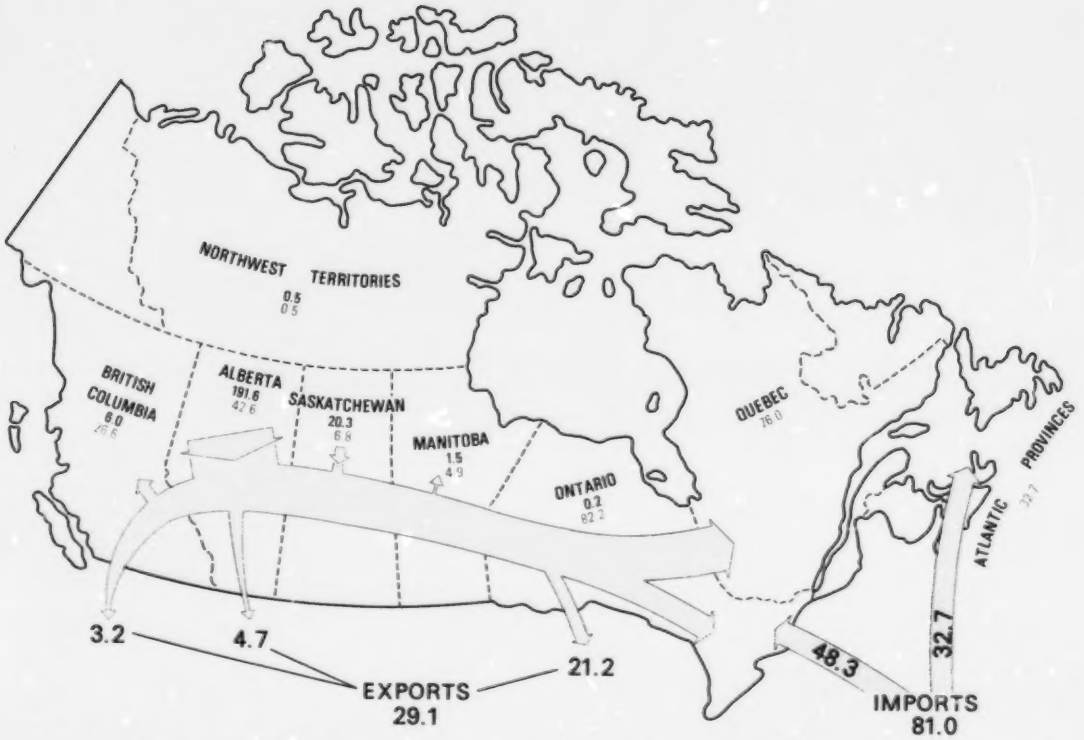
At present there are over 400 gas processing plants in Alberta where the gas is stripped of its by-products and upgraded to pipeline quality. Additional processing capacity is being provided by the expansion of existing facilities and by the construction of new plants.

The sale of crude oil, natural gas and related products totalled approximately 93 per cent of the nearly $18 billion value of minerals produced in 1981. Alberta government revenue from mineral resources for the years 1970/71 through 1981/82 is shown in an accompanying table.

Table 3.3 Oil and Gas Well Depth Drilled - Wells Completed and Year End Status - Alberta - 1971 and 1976-1981

Depth Drilled (kilometres)	**1971**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**
Development	1,132	2,909	2,926	3,348	3,840	4,716	3,598
Outpost	87	73	35	60	301	516	482
Exploration	1,227	1,893	2,289	2,718	2,772	3,187	2,686
Total	**2,446**	**4,875**	**5,250**	**6,126**	**6,913**	**8,419**	**6,766**
Well Completions (number)							
Oil	362	552	702	944	1,252	1,612	1,425
Gas	691	5,101	2,952	3,090	3,177	3,897	3,056
Dry	898	1,296	1,416	1,471	1,284	1,483	1,293
Suspended	53	8	20	13	15	4	11
Service	21	84	40	55	52	52	49
Total	**2,025**	**5,041**	**5,130**	**5,573**	**5,780**	**7,048**	**5,834**
Well Status at Year End (number)							
Oil Wells							
Capable of Production	14,065	15,663	16,224	16,871	17,673	18,833	20,072
Operated	9,467	11,166	11,592	12,151	12,805	13,312	14,243
Gas Wells							
Capable of Production	3,426	9,010	12,529	14,897	17,173	19,546	22,611
Operated	2,830	7,753	10,806	12,785	14,760	16,661	18,797
Capped	1,801	4,864	6,023	6,686	8,268	10,094	11,593


Fort Chipewyan
High Level
Fort McMurray
Peace River
Grande Prairie
Grande Cache
St. Albert
Edmonton
Lloydminster
Jasper
Wetaskiwin
Camrose
Red Deer
Drumheller
Banff
Calgary
Medicine Hat
Lethbridge
Alberta
CANADA
MAIN PIPE LINES
REFINERIES
GAS PLANTS
1982
— MAIN OIL PIPE LINE
— MAIN GAS PIPE LINE
OIL REFINERY
MAIN GAS PROCESSING PLANT
Produced by the Alberta Bureau of Surveying and Mapping © 1982



MOVEMENTS OF OIL WITHIN, TO AND FROM CANADA, 1981

CONVENTIONAL AND SYNTHETIC CRUDE OIL, PENTANES PLUS AND EQUIVALENT

FIGURES IN THOUSANDS OF CUBIC METRES PER DAY

PRODUCTION BLACK 220.1 DOMESTIC CONSUMPTION RED 272.3

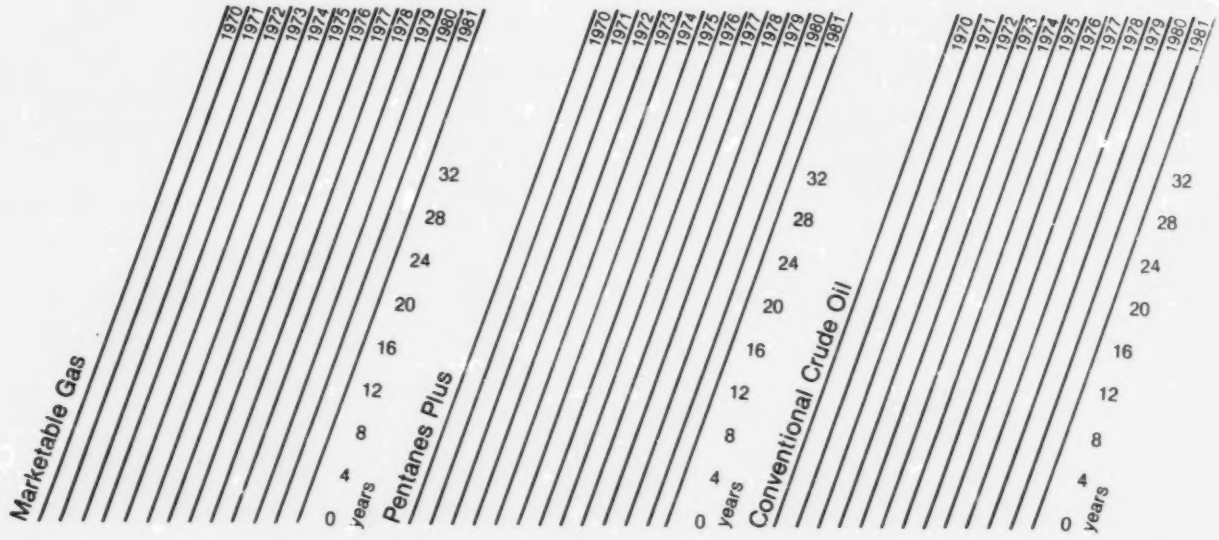
MOVEMENTS OF NATURAL GAS WITHIN, TO AND FROM CANADA, 1981

FIGURES IN MILLIONS OF CUBIC METRES PER DAY

PRODUCTION BLACK 192.1 DOMESTIC CONSUMPTION RED 132.5

Produced by the Alberta Bureau of Surveying and Mapping © 1982

Life Indices of Conventional Oil, Marketable Gas and Pentanes Plus



Relative Values of Fuels Produced - Alberta - 1951, 1961, 1971, 1981 (millions of dollars)

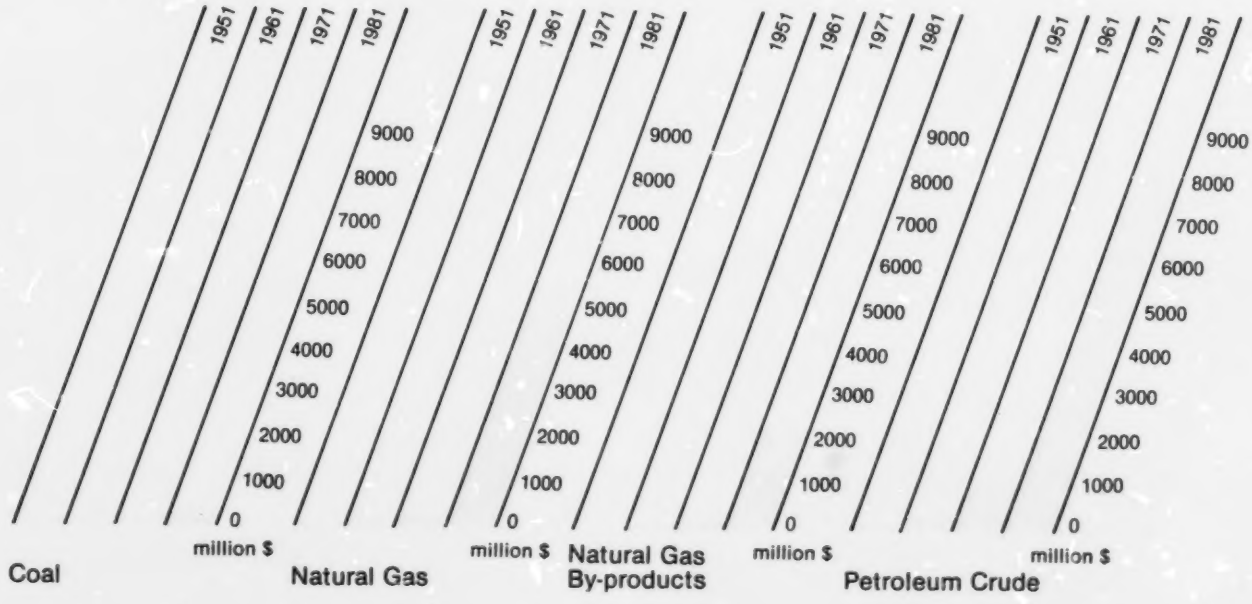


Table 3.4 **Annual Production of Liquid Hydrocarbons and Natural Gas, by Types - Alberta - 1967-1981** (cubic metres)

	Crude Oil* '000	Synthetic Crude Oil '000	Condensate '000	Pentanes Plus '000	Propane* '000	Butanes* '000	Natural Gas* '000 000
1967	36,626	72	122	4,540	2,033	1,319	35,244
1968	39,853	910	128	4,934	2,303	1,507	40,447
1969	44,353	1,603	113	5,786	2,637	1,655	47,275
1970	51,715	1,920	125	6,657	3,184	1,992	54,690
1971	56,440	2,469	125	7,071	3,644	2,343	60,258
1972	67,481	2,963	145	9,270	4,492	2,985	67,656
1973	83,001	2,906	159	9,427	5,113	3,333	73,488
1974	79,105	2,654	119	9,012	5,071	3,368	73,575
1975	67,512	2,474	114	8,443	5,352	3,495	74,021
1976	60,908	2,779	115	7,421	5,235	3,435	74,922
1977	60,514	2,611	122	7,344	5,337	3,500	78,337
1978	60,015	3,239	122	6,561	5,036	3,211	77,702
1979	68,576	5,329	134	6,472	5,542	3,471	82,512
1980	63,201	7,410	111	5,891	5,294	3,249	77,438
1981	56,979	6,446	95	5,652	5,192	3,126	76,686

*Net production

Table 3.5 **Canadian Natural Gas Production* - by Province and Territory - Selected Years - 1947-1981** (millions of cubic metres)

	N.W.T.	British Columbia	Alberta	Saskat-chewan	Western Canada	Eastern Canada	Canada
1947-1956	38.3	13.8	28,088.6	1,167.9	29,430.7	2,678.7	32,109.4
1957-1966	144.6	31,249.4	181,345.3	15,627.6	234,367.0	4,346.2	238,713.2
1967	17.6	6,732.0	35,368.0	1,750.2	43,867.8	403.9	44,271.7
1968	20.0	7,681.1	40,437.1	1,928.3	50,066.4	345.6	50,412.3
1969	19.3	8,908.0	47,275.0	1,974.4	58,176.6	322.2	58,498.8
1970	25.3	9,560.8	54,441.5	2,271.3	66,298.9	475.5	66,774.4
1971	60.3	9,960.4	59,592.2	2,460.6	72,073.5	461.4	72,534.9
1972	451.4	12,412.9	67,967.4	2,204.5	83,036.3	355.2	83,391.5
1973	1,093.8	13,459.9	73,609.0	2,160.6	90,323.2	275.2	90,598.4
1974	966.3	11,624.8	73,353.3	2,018.8	87,963.2	219.1	88,182.4
1975	934.5	11,276.9	74,463.2	1,960.7	88,635.1	310.8	88,945.9
1976	1,025.8	10,829.5	75,237.7	1,902.5	88,995.5	142.2	89,137.7
1977	855.6	11,061.4	78,520.4	1,669.1	92,106.5	241.7	92,348.2
1978	618.8	9,989.3	77,353.2	1,714.0	89,675.4	350.2	90,025.6
1979	626.1	11,384.2	81,996.9	1,559.1	95,566.4	388.2	95,954.6
1980	494.2	8,966.9	77,358.3	1,590.6	88,410.1	349.3	88,759.4
1981	397.5	8,418.6	76,375.6	1,498.4	86,690.1	427.1	87,117.2
Total	**7,789.4**	**183,520.9**	**1,256,057.4**	**45,499.7**	**1,492,918.0**	**24,868.5**	**1,517,786.5**

*Raw natural gas production less raw and processed gas injection.

Table 3.6 Canadian Crude Oil Production - by Province and Territory - Selected Years - 1947-1981

(millions of cubic metres)

	N.W.T.	B.C.	Alberta*	Sask.	Man.	Western Canada	Eastern Canada	Canada
1947-1956	0.43	0.02	93.65	7.44	2.05	103.63	0.51	104.21
1957-1966	0.86	10.60	246.12	100.89	7.71	368.23	1.73	369.94
1967	0.11	3.12	36.68	14.70	0.89	55.51	0.19	55.70
1968	0.12	3.52	39.97	14.60	0.99	59.19	0.19	59.39
1969	0.13	4.02	44.38	13.89	0.98	63.41	0.19	63.60
1970	0.13	4.02	51.74	14.22	0.94	71.07	0.18	71.24
1971	0.15	4.02	56.46	14.06	0.89	75.56	0.16	75.72
1972	0.14	3.78	67.44	13.77	0.84	85.99	0.14	86.11
1973	0.15	3.37	82.98	13.62	0.81	100.94	0.13	101.07
1974	0.16	2.99	79.07	11.73	0.75	94.71	0.11	94.84
1975	0.16	2.27	64.47	9.38	0.70	80.00	0.11	80.11
1976	0.14	2.37	60.86	8.88	0.63	72.89	0.10	72.99
1977	0.14	2.20	60.48	9.76	0.63	73.21	0.10	74.21
1978	0.14	2.00	60.00	9.64	0.60	72.38	0.10	75.38
1979	0.15	2.14	68.52	9.37	0.58	80.76	0.10	80.86
1980	0.16	2.00	63.20	9.33	0.56	75.25	0.10	75.35
1981	0.17	2.04	56.98	7.39	0.54	67.12	0.09	67.21

*Some condensate included prior to 1951.

Table 3.7 Production of Crude Oil by Field - Alberta - Selected Years - 1914-1981 (thousands of cubic metres)

Field	1914-73	1974	1975	1976	1977	1978	1979	1980	1981
Acheson	9,358	747	667	604	604	605	860	775	737
Bantry	3,351	334	318	270	297	283	270	239	248
Bonnie Glen	31,926	4,863	3,115	2,606	2,636	2,658	4,738	4,257	4,167
Carson Creek North	7,262	1,335	1,176	1,065	1,087	1,086	1,307	1,213	1,074
Clive	2,652	254	365	397	410	428	457	411	410
Fenn Big Valley	22,248	1,653	1,478	1,319	1,276	1,353	2,585	2,587	2,740
Garrington	1,952	95	143	159	162	137	113	116	143
Gilbey	4,275	254	254	254	265	268	242	229	213
Golden Spike	17,942	2,988	1,748	1,351	1,179	1,106	761	418	324
Goose River	3,083	318	334	286	299	342	289	283	261
Harmattan East	5,293	715	572	493	508	474	480	393	298
Harmattan Elkton	4,908	381	381	365	380	338	329	323	316
Innisfail	5,768	620	540	413	432	448	649	560	449
Joarcam	11,409	477	445	350	336	313	305	259	218
Joffre	10,091	222	207	222	238	231	230	210	185
Judy Creek	27,396	5,022	3,893	3,337	3,284	3,251	3,291	2,901	2,082
Kaybob	7,819	858	795	636	616	638	814	669	545
Kaybob South	3,415	747	493	620	576	589	713	654	561
Leduc-Woodbend	50,914	1,255	1,096	953	797	680	662	569	530
Medicine River	3,720	413	429	429	446	455	467	491	490
Mitsue	13,682	2,733	2,813	2,320	2,310	2,294	2,510	2,423	2,226
Nipisi	11,854	3,162	2,463	2,145	2,048	2,120	2,337	1,901	1,947

	1947-73	1974	1975	1976	1977	1978	1979	1980	1981
Pembina	120,661	6,579	5,641	5,053	4,732	4,673	4,933	4,544	4,305
Rainbow	24,695	5,403	4,640	4,513	4,326	4,204	4,440	4,223	3,702
Rainbow South	3,053	604	509	636	637	576	591	554	408
Red Earth	1,764	365	318	286	296	270	268	267	237
Redwater	78,853	7,040	4,799	4,243	4,203	4,295	5,720	4,596	2,875
Simonette	2,670	493	413	350	342	327	209	168	144
Snipe Lake	4,211	588	429	445	429	353	317	270	241
Stettler	5,102	254	222	175	167	179	186	182	182
Sturgeon Lake South	10,059	938	969	858	896	854	922	823	718
Sundre	3,147	207	222	222	189	187	174	166	164
Swan Hills	47,593	7,008	6,865	6,150	5,540	4,799	4,377	4,018	3,276
Swan Hills South	20,166	3,178	3,607	3,417	3,213	3,355	3,253	3,218	2,303
Turner Valley	19,595	175	175	175	190	184	187	182	175
Virgina Hills	10,044	1,398	1,224	1,049	966	816	682	728	634
Virgo	3,179	365	302	222	215	203	202	191	164
Wainwright	4,162	381	397	413	443	448	429	394	393
Westerose	7,612	1,033	795	652	635	647	1,033	883	877
Willesden Green	7,961	810	842	810	784	807	840	786	709
Wizard Lake	20,467	3,003	2,368	1,986	2,017	2,033	2,948	2,688	2,586
Zama	5,689	731	524	477	453	439	430	375	319
Other Fields & Areas	72,209	9,233	8,486	8,136	9,618	10,351	11,913	12,039	12,396
Annual Production	**150,424**	**79,074**	**67,473**	**60,863**	**60,477**	**59,997**	**68,463**	**63,176**	**56,972**
Cumulative Production	**1,966,223**	**812,284**	**879,758**	**940,620**	**1,001,097**	**1,061,094**	**1,129,557**	**1,192,733**	**1,257,777***

*Includes Adjustments from Previous Years

Table 3.8 Estimated Remaining Established Reserves of Liquid Hydrocarbons, by Province - Canada - 1971 and 1976-1981 (millions of cubic metres)

	1971	1976	1977	1978	1979	1980	1981
Conventional Crude Oil							
British Columbia	46.4	25.7	24.4	22.8	27.6	25.9	25.9
Alberta	1,173.6	871.3	830.0	794.4	760.2	720.0	696.0
Saskatchewan	137.0	122.9	119.4	117.2	117.7	117.7	117.0
Manitoba	12.4	7.1	6.5	6.3	5.7	5.2	4.9
N.W.T.	11.7	10.9	10.8	10.6	21.1	21.0	20.9
Eastern Canada	2.0	2.2	2.1	1.5	1.5	1.4	0.1
East Coast Offshore	—	—	—	—	—	—	176.0
Total	**1,383.1**	**1,040.1**	**993.2**	**952.8**	**933.8**	**891.2**	**1,040.8**
Natural Gas Liquids							
British Columbia	—	6.6	5.0	5.0	4.9	4.9	6.0
Alberta	—	293.0	293.1	304.0	301.6	294.2	321.2
Saskatchewan	—	1.5	1.7	1.6	1.5	1.3	1.2
N.W.T.	—	8.5	8.4	8.4	8.3	2.2	0.5
Arctic Islands/Beaufort	—	—	—	—	—	13.0	13.0
Total	—	**309.6**	**308.2**	**319.0**	**316.3**	**315.6**	**341.9**
Total Liquid Hydrocarbons	—	**1,349.7**	**1,301.4**	**1,271.8**	**1,250.1**	**1,206.8**	**1,382.7**

Table 3.9 **Estimated Remaining Established Reserves of Marketable Natural Gas, by Province - Canada - 1971 and 1976-1981** (millions of cubic metres)

	1971	1976	1977	1978	1979	1980	1981
British Columbia	270.9	188.5	209.7	218.4	207.4	206.7	222.3
Alberta	1,223.2	1,285.4	1,478.3	1,549.7	1,646.4	1,661.4	1,723.1
Saskatchewan	22.9	23.9	33.1	35.3	35.4	33.7	32.6
N.W.T.	37.9	135.9	500.3	509.4	598.0	579.8	576.3
Eastern Canada	7.7	8.3	9.4	9.4	8.9	8.3	8.8
Total:	**1,562.6**	**1,642.0**	**2,230.8**	**2,322.2**	**2,496.1**	**2,491.9**	**2,562.9**

Table 3.10 **Petroleum Industry Expenditures - Alberta and Canada - Selected Years - 1947-1981** (millions of dollars)

	1947-73	1974	1975	1976	1977	1978	1979	1980	1981
Alberta									
Exploration	2,917.1	258.9	248.1	402.0	618.1	994.8	1,377.2	2,073.9	1,895.9
Development	1,886.8	136.4	212.3	277.2	351.2	477.4	679.2	1,063.3	1,083.2
Land	2,706.7	157.3	207.9	255.5	679.9	740.5	1,144.7	1,176.5	721.3
Production Facilities	1,500.0	192.9	225.9	413.4	366.2	485.9	654.4	819.8	1,024.2
Production Costs	2,442.1	373.0	494.2	615.1	707.3	852.3	1,092.3	1,304.7	1,640.7
Gas Plants	1,127.5	126.1	123.8	155.0	143.8	165.9	204.7	241.1	310.9
Royalties	2,104.4	1,107.2	1,477.7	1,974.1	2,398.9	3,054.9	3,623.3	4,248.0	4,496.7
Other	902.0	173.8	219.2	384.9	353.0	435.3	591.6	1,016.8	193.8
Total	**15,586.7**	**2,525.6**	**3,209.1**	**4,477.2**	**5,618.4**	**7,207.0**	**9,367.4**	**11,944.1**	**11,366.7**
Canada									
Exploration	5,160.2	682.4	629.8	832.1	1,137.4	1,739.5	2,358.2	3,420.9	3,457.8
Development	2,479.3	165.3	244.6	277.2	351.2	477.4	898.0	1,309.0	1,247.9
Land	3,514.4	215.1	253.7	344.0	860.1	1,014.8	1,438.0	1,498.9	872.3
Production Facilities	1,962.8	225.2	254.8	454.6	416.7	605.4	797.7	1,363.2	1,217.7
Production Costs	3,282.1	457.1	591.5	729.6	833.8	1,003.7	1,318.8	1,612.7	1,950.8
Gas Plants	1,275.9	136.4	138.2	170.7	155.5	218.8	301.9	311.6	347.1
Royalties	2,641.7	1,343.2	1,721.6	2,202.7	2,673.8	3,388.2	4,026.7	4,707.9	4,905.7
Other	1,079.6	204.6	255.8	482.5	479.1	624.0	637.5	878.1	951.5
Total	**21,395.7**	**3,429.8**	**4,090.0**	**5,493.4**	**6,907.6**	**9,071.8**	**11,776.8**	**15,102.3**	**14,256.6**

Table 3.11 **Alberta Government Revenue from Mineral Resources - Fiscal Years - 1973/74-1981/82**
(thousands of dollars)

	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
Coal									
Fees, Rental & Bonus	3,484	3,447	4,193	3,471	3,840	4,165	1,495	4,249	4,408
Royalty	676	710	888	6,794	15,198	19,646	7,543	8,263	11,920
Sundry Revenue	—	—	—	—	—	—	—	—	—
Petroleum & Natural Gas									
Fees, Rental & Bonus	133,092	133,221	184,602	265,594	800,985	782,543	1,121,994	843,073	647,921
Royalty	372,214	1,188,016	1,503,628	1,815,964	2,304,006	3,076,603	3,409,776	3,872,107	4,136,111
Salt									
Fees, Rental & Royalty	27	36	32	42	34	39	34	36	40
Quarrying									
Fees, Rental & Royalty	102	117	93	117	117	125	111	108	140
Quartz									
Fees, Rental & Bonus	14	18	33	109	172	109	0	0	0
Oil Sands									
Fees, Rental & Royalty	9,704	16,089	19,927	23,909	28,929	36,267	51,254	229,390	234,550
Mineral Tax	69,075	45,356	54,082	76,319	76,452	96,828	99,949	145,796	134,830
Mining Miscellaneous									
Fees, Rental & Royalty	74	132	94	73	65	69	12	0	46
Administration Sundry Revenue	92	82	145	273	283	23	347	381	2,402*
Landman Licence Fees	11	—	5	5	6	13	10	15	39
Total Applied Revenue	588,565	1,387,224	1,767,721	2,192,671	3,230,093	4,016,430	4,692,525	5,103,418	5,172,407
Less Incentive Credits	10,128	15,251	33,360	49,243	75,160	114,049	98,782	148,476	156,204
Total Cash Revenue	**578,437**	**1,371,973**	**1,734,361**	**2,143,428**	**3,154,933**	**3,902,381**	**4,593,743**	**4,954,942**	**5,016,203**

Oil Sands

Oil sands deposits underlie 60,000 square kilometres of northern and eastern Alberta. The importance and potential of these relatively untapped oil reserves have increased dramatically in recent years because of decreasing conventional crude oil supplies, increasing world petroleum prices and the desire of both the federal and provincial governments to lessen Canadian dependence on oil imports. More sophisticated recovery techniques have made exploitation of this oil source technologically feasible.

The four major deposits—Athabasca, Cold Lake, Wabasca and Peace River — together hold an estimated 200 billion cubic metres of bitumen in place. However, to date, only 5.2 billion cubic metres, all of it in the Athabasca deposit, have been recognized as recoverable reserves. The same area also encompasses the virtually unexplored bituminous carbonates reservoir which recent studies have suggested may contain up to 50 billion cubic metres of bitumen. To date, little drilling, recovery research or field experimentation has been done on this potential reserve.

The Athabasca is the largest of the deposits, with bitumen reserves estimated at 146 billion cubic metres in place. It is the only deposit to be exploited commercially, with two plants currently operating. The deposit is surface-mined, as the overburden coverage in this area is only 120 metres thick. Elsewhere in this deposit and in the other three deposits the overburden is much thicker and recovery is possible using only underground or "in situ" techniques. As the bitumen may range in form from a viscous heavy oil to a solid, the recovery process requires several stages. Very heavy gravity (6 degrees to 12 degrees API) and extremely high viscosity (20,000 to 500,000 centipoise) make bitumen 2,000 to 50,000 times less able to flow than conventional crude oil.

The bitumen deposits are mined with bucket-wheel excavators or with giant draglines. The sand and crude bitumen are then separated using a hot-water flotation process developed by the Alberta Research Council. The sands are exposed to steam, producing a thick slurry which is dropped into hot water. As the oil and sand separate, the sand sinks and the oil can be skimmed off. The resulting raw bitumen is upgraded by removing sulphur and nitrogen, and either by adding hydrogen or removing carbon. The end-product of this process is a high-grade synthetic crude oil suitable for refining. The synthetic crude yields generous amounts of aromatics used in the production of phenol, styrene, polyesters, surfactants and dye-stuffs. As a partially-refined feedstock, synthetic crude commands a premium price of about three per cent more than typical conventional crude oil.

Both commercial oil sands plants currently operating in the Athabasca deposit are essentially similar, although the first plant in operation uses electrically powered bucket-wheel excavators to mine the sands while the second utilizes enormous draglines.

The first plant opened in 1967, a pioneer in commercial oil sands production. After overcoming some serious technological problems in its first two years of operation, the plant has gradually attained daily production rates of 6,000 to 8,000 cubic metres of synthetic crude oil. The first expansion of this plant is scheduled to begin in late 1983.

The second plant commenced operation in 1978, and has steadily increased production rates in its first four years of operation. By the end of 1981, oil production was 13,000 cubic metres per day with design capacity of 21,000 cubic metres expected to be reached by 1986. This plant has been the site of innovative techniques: the use of the giant draglines, the installation of facilities to ensure optimal separation of bitumen and sands, as well as the installation and operation of the largest fluid coking facilities in the world. The Alberta government, through Alberta Oil Sands Equity, has a share of 16.74 per cent in this project.

More than 30 experimental "in situ" recovery schemes are scattered throughout all four deposits. In these projects, heat is applied to reduce the viscosity of the bitumen; the deposit is then injected with a stimulant such as steam, hot water, air or a caustic substance. Several pilot projects are nearing commercial feasibility, although several factors, such as the world energy outlook and local capacity to handle such endeavours, will affect the timing of development.

Coal

The coal industry underwent a decline in the early 1950's, but in recent years has sustained the recovery that began in the early 1960's. The industry has been boosted by exports to Japanese metallurgical firms and by the replacement of natural gas with coal in the province's major electric utilities. In addition, large eastern utilities, notably Ontario Hydro, have begun to supplement their supplies with Alberta coal. The coal sector now ranks as one of the largest extractive industries in the province.

Coal industry productivity has improved through the use of large equipment and through the shift away from many small operations to fewer large, efficient mines.

Coal-bearing formations underlie approximately 300,000 square kilometres of Alberta in three distinct regions — the Plains, Foothills and Mountain. The accompanying map illustrates the general pattern of coal distribution. Coal in the Foothills and Mountain regions has a higher calorific value and less moisture, making it a higher quality fuel. Alberta coal is a clean-burning fuel, as it has a very low sulphur content.

The Plains Region of eastern Alberta contains an estimated 13.8 billion tonnes of coal, the majority of which is subbituminous coal suitable for thermal-electric generation. Lignite, which has a greater moisture content and lower calorific value than subbituminous coal, is present in smaller amounts. Recently, interest has been generated in the deeper coals requiring underground mining, which make up nearly half of the Plains' reserves. Coal in the Foothills is generally high-volatile bituminous thermal. The majority of the 850 million tonnes in reserves can be surface-mined.

Mountain coals range from semi-anthracite to high-volatile bituminous, although most are low-to medium-volatile bituminous suitable for coking and for the production of steel. Recoverable reserves in this region total 1.75 billion tonnes, of which about 70 per cent will require underground mining. As only the flat-lying parts of these reserves can be mined using conventional technology, a recovery method will have to be devised for the thick and steeply-dipping reserves which are often folded and faulted. Most mining in the Mountain region is currently done by the open-pit, shovel and truck system. Production from the Mountain and Foothills regions is upgraded in coal-preparation plants, which yield about two-thirds clean coal.

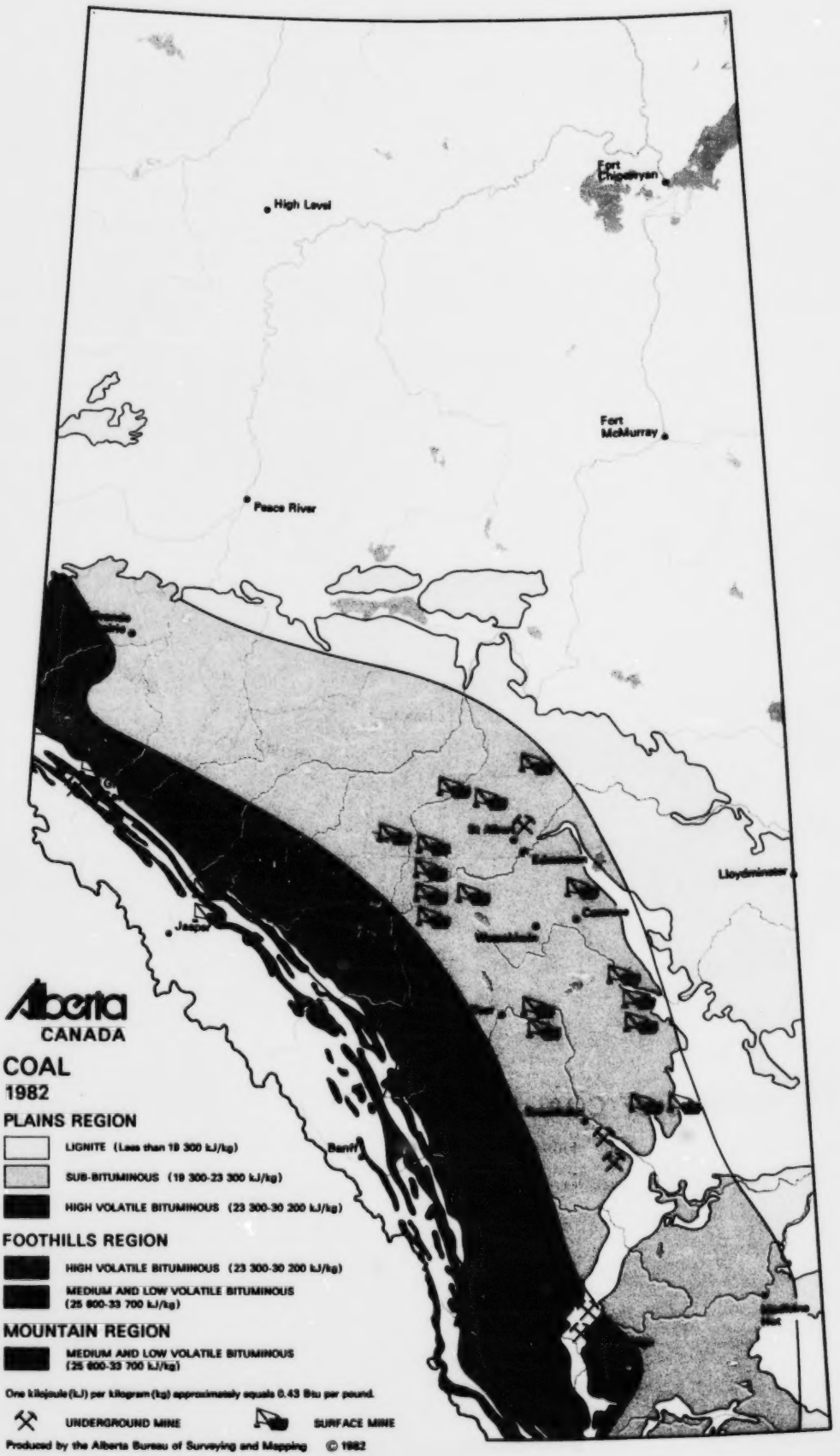
The cost of strip-mining the shallow parts of flat-lying coal seams of the Plains region is low, since the cover is mainly glacial tills and soft sediments. Reclamation of such areas is usually not expensive. Most of the current production of Plains region coal is burned "as mined" in mine-site electric-generation stations.

The open-pit mines of the Mountain and Foothill regions require drilling and blasting of rock. The cost of mining, including reclamation, is considerably greater than in the Plains region, where mining is by dragline.

The Energy Resources Conservation Board has estimated the total recoverable reserves of coal at 15.6 billion tonnes, and "in-place" resources at triple that amount. Deliveries have increased in recent years, and currently total about 17.9 million tonnes per year. In 1981, Alberta used 11.7 million tonnes, or 65 per cent of the coal sold. Nearly 1.9 million tonnes (11 per cent) were shipped to other provinces and 4.3 million tonnes went to offshore areas. areas.

Many of the large Plains coal fields may be dedicated to electric-power generation. Some of the electricity generated from coal could be used in railway electrification and for further development of urban light-rail transit systems, thus freeing significant quantities of oil for other uses. Certain deposits could be mined economically to provide feedstock for large synthetic natural gas plants, or for other uses such as the manufacture of liquid fuels, or to provide heat for the recovery of heavy oils and bitumen from the deep oil sands deposits of the province.

Current forecasts indicate increased long-term demand for thermal coal in the Pacific Rim countries. As well, the prospect of future contracts with Japanese steel mills has encouraged the development of metallurgical coal mines and plants in Alberta. A strong demand is also forecast for high-grade steam coal from the Mountain region.


High Level
Fort Chipewyan
Fort McMurray
Peace River
Lloydminster
Jasper
Banff
Alberta
CANADA
COAL
1982
PLAINS REGION
LIGNITE (Less than 19 300 kJ/kg)
SUB-BITUMINOUS (19 300-23 300 kJ/kg)
HIGH VOLATILE BITUMINOUS (23 300-30 200 kJ/kg)
FOOTHILLS REGION
HIGH VOLATILE BITUMINOUS (23 300-30 200 kJ/kg)
MEDIUM AND LOW VOLATILE BITUMINOUS (25 600-33 700 kJ/kg)
MOUNTAIN REGION
MEDIUM AND LOW VOLATILE BITUMINOUS (25 600-33 700 kJ/kg)
One kilojoule (kJ) per kilogram (kg) approximately equals 0.43 Btu per pound.
UNDERGROUND MINE
SURFACE MINE
Produced by the Alberta Bureau of Surveying and Mapping © 1982

MOVEMENTS OF COAL WITHIN, TO, AND FROM CANADA, 1981

FIGURES IN MILLIONS OF TONNES PER YEAR

PRODUCTION BLACK 40.1

DOMESTIC CONSUMPTION RED 37.5

Produced by the Alberta Bureau of Surveying and Mapping ©1982

Table 3.12 Remaining Established Reserves of Coal in Alberta - 1981

Rank	Region	Mineability	In-Place Resources	Reserves
			(billion tonnes)	
Low- and Medium-Volatile Bituminous	Mountain	Surface	1.00	0.47
		Underground	6.30	1.20
			7.30	1.67
High-Volatile Bituminous	Mountain	Surface	0.06	0.03
		Underground	0.59	0.05
	Foothills	Surface	0.88	0.63
		Underground	0.69	0.22
	Plains	Surface	0.06	0.03
		Underground	0.56	0.13
			2.84	1.09
Subbituminous	Plains	Surface	12.00	6.90
		Underground	24.00	5.80
			36.00	12.70
Lignite	Plains	Surface	0.13	0.07
		Underground	0.31	0.04
			0.44	0.11
Total			**46.58**	**15.57**

Table 3.13 Disposition of Alberta Coal - 1967-1981 (thousands of tonnes)

	Subbituminous				Bituminous						
			Sales to:				Sales to:				
Year	Total Sales	Value of Sales(1) $ 000	Alberta	Other(2) Provinces	Total Sales	Value of Sales(1) $ 000	Alberta	Other Provinces	United States	Japan	Other(3) Countries
1967	2,412	—	1,803	610	845	—	33	103	9	702	—
1968	2,689	—	2,409	279	852	—	18	91	8	734	—
1969	2,893	—	2,710	183	911	—	6	85	10	809	—
1970	3,553	—	3,271	283	222	—	2	35	5	2,172	—
1971	4,008	—	3,881	126	3,196	—	2	75	5	3,029	84
1972	4,455	10,205	4,286	170	3,401	38,613	31	81	4	3,285	—
1973	4,480	11,349	4,370	110	4,062	49,500	315	82	213	3,453	—
1974	5,080	13,232	4,833	248	3,335	71,421	130	327	184	2,672	23
1975	5,980	17,687	5,212	768	4,146	162,357	145	392	58	3,551	—
1976	6,322	20,004	5,723	600	4,768	214,657	120	177		4,361	111
1977	7,670	23,611	7,223	447	4,253	192,382	175	26	—	4,007	44
1978	8,246	30,555	7,781	465	5,194	216,233	148	630	15	3,841	560
1979	9,407	44,723	9,226	181	5,139	202,280	147	1,630	7	2,522	803
1980	10,426	56,761	10,249	177	7,448	310,318	432	1,750	—	4,084	1,165
1981	11,221	69,993	11,144	77	6,729	411,837	543	1,880	—	3,022	1,284

(1) Unavailable prior to 1972.
(2) Includes sales of small amounts to the U.S. in 1967, 1968, 1971 and 1974.
(3) Includes Argentina, Brazil, Chile, Germany, Indian and Korea, Mexico and Taiwan
(4) Confidential.

Electric Power

Throughout the world the availability of electrical energy at reasonable cost is becoming an increasingly important factor in industrial development. Alberta is fortunate because of its hydroelectric potential and abundance of coal, natural gas, and oil.

Much of the province's subbituminous coal reserves is surface-mineable at low cost and is reasonably close to the major electric energy load centres. Natural gas is transported through an efficient pipeline network throughout the province. Although gas is more costly than coal, the price differential in the past was offset by the lower capital cost of gas-fired electricity generating plants.

Hydroelectric power is developed along the Bow River System west of Calgary and along the North Saskatchewan River system adjacent to the foothills of central Alberta. Although the development of hydro sites can require a substantial amount of capital, the absence of a fuel cost makes certain hydro projects competitive with thermal generation. In addition, water is a renewable resource and occasionally hydro developments have side benefits such as stream control, irrigation, and creation of recreational potential. Existing hydro developments in the province are capable of generating in the order of 1,800 gigawatt hours (GWh) a year with potential ultimate hydroelectric development estimated to be 60,000 GWh a year.

The province is the fourth largest producer of electrical energy in Canada. Its coal, hydro, natural gas, and fuel oil plants had a total net capability of some 5,500 megawatts at the end of 1981 and generated some 23,100 GWh of electricity. Hydro plants in the province carry much of the peak load while thermal gas-and coal-fired plants carry the intermediate and base load. In 1981, about 898,000 customers were served, including 86,000 farms. The growth in the annual electric energy consumption and revenue earned is shown in the accompanying tables. Average revenue rose from 1.45 to 3.63 cents per kilowatt-hour over the period 1971 to 1981. Nine per cent of the electrical energy is generated by hydro, 77 per cent by coal, 14 per cent by natural gas, and a very minor amount by fuel oil. Alberta's net annual generation, requirements, and inter-changes of electric energy are shown.

Power plants and major consumption centres are connected by an extensive network of transmission lines which provide reliable service. These lines extend from Medicine Hat in the southeast to areas beyond Rainbow Lake in northwestern Alberta, within 80 km of the Northwest Territories. Isolated plants, which are not connected to the main transmission system, serve a few communities such as Jasper. The ready availability of electric energy at reasonable costs has contributed significantly to the development of both rural and urban areas.

The principal municipal electric utilities in the province are those in Edmonton, Calgary, Lethbridge, Medicine Hat, and Red Deer. Privately owned utilities supply most of the smaller communities and farms as well as bulk power to the cities of Calgary, Lethbridge, and Red Deer. Net capacity and net energy generated in 1981 and the distribution of new capacity and net generation by type of power source are shown in the accompanying tables.

Major recent additions to the provincial generating capacity include a 363 megawatt coal-fuel unit installed at the existing Battle River Power Plant. Work is now in progress to install two 363-megawatt units at the new Keephills Power Plant in 1983 and 1984, two 363-megawatt units at the new Sheerness Power Plant in 1985 and 1986 and two 363-megawatt units at the new Genesee Power Plant in 1986 and 1987.

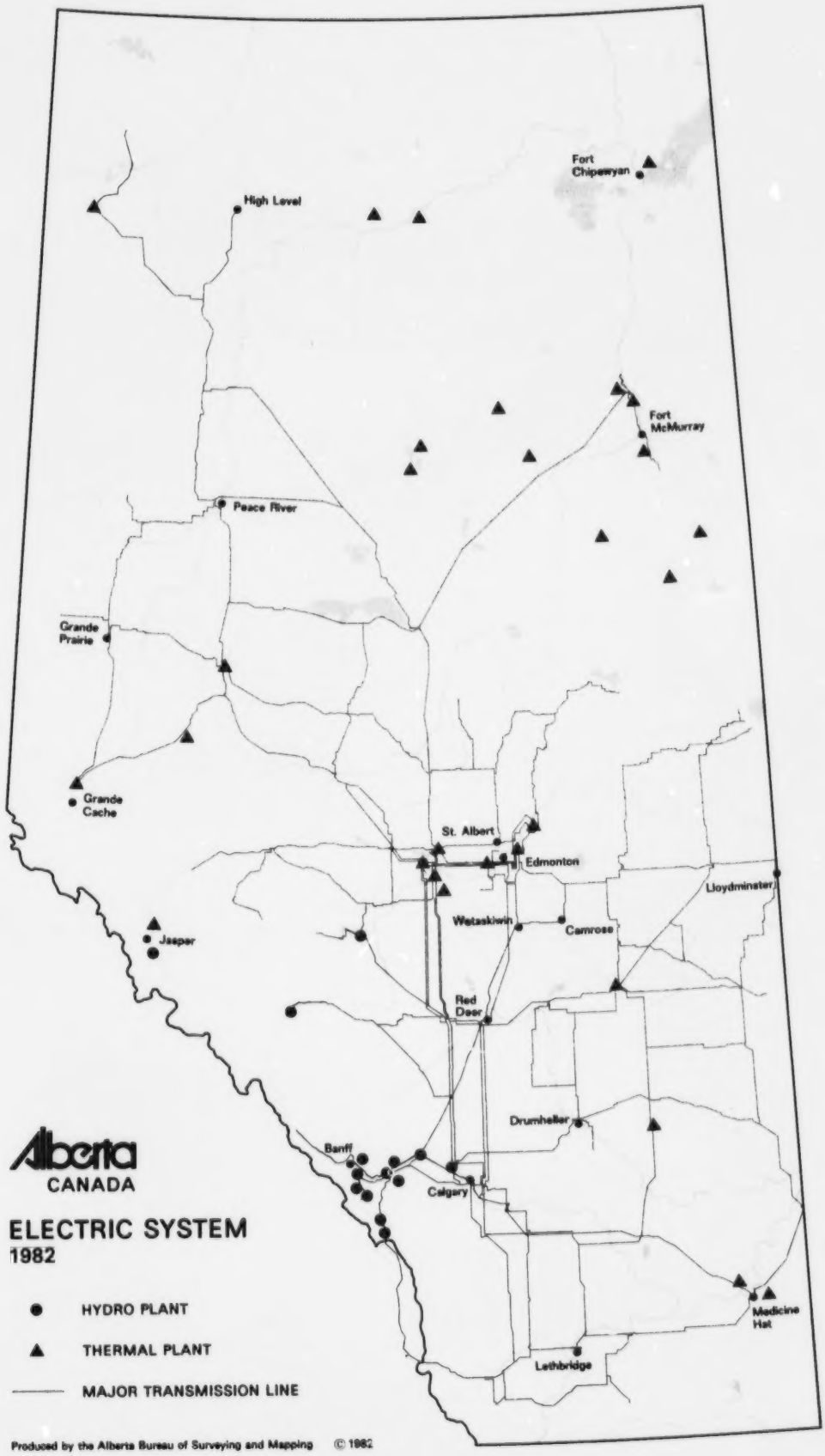

Fort Chipewyan
High Level
Fort McMurray
Peace River
Grande Prairie
Grande Cache
St. Albert
Edmonton
Lloydminster
Wetaskiwin
Camrose
Jasper
Red Deer
Drumheller
Banff
Calgary
Medicine Hat
Lethbridge
Alberta
CANADA
ELECTRIC SYSTEM
1982
HYDRO PLANT
THERMAL PLANT
MAJOR TRANSMISSION LINE
Produced by the Alberta Bureau of Surveying and Mapping © 1982

Table 3.14 Supply of Electrical Energy - Alberta - 1968-1981 (gigawatt hours)

	Total Generation	Received from USA	Received from Other Provinces	Total Supply	Delivered to Other Provinces	Available for Use in Alberta
1968	7,751.8	0.9	24.3	7,777.2	24.0	**7,753.1**
1969	8,877.9	1.0	17.6	8,896.6	51.3	**8,845.3**
1970	10,035.2	1.0	1.7	10,038.1	158.2	**9,879.8**
1971	11,097.5	1.1	2.5	11,101.2	154.2	**10,946.9**
1972	12,497.8	1.2	4.5	12,503.6	148.3	**12,355.3**
1973	13,630.3	1.2	119.1	13,750.7	123.4	**13,627.3**
1974	14,371.8	1.3	179.3	14,552.5	162.5	**14,389.9**
1975	15,099.9	1.6	297.4	15,399.0	153.2	**15,245.7**
1976	15,924.3	1.7	430.3	16,356.2	116.0	**16,240.2**
1977	17,728.2	1.8	142.5	17,872.4	396.1	**17,476.3**
1978	19,161.9	1.9	227.2	19,391.0	279.6	**19,111.4**
1979	21,062.8	1.9	106.1	21,710.9	395.0	**21,315.9**
1980	23,391.3	1.9	105.3	23,498.6	385.4	**23,133.1**
1981	24,501.2	2.1	168.8	24,672.1	261.7	**24,410.4**

Table 3.15 Disposal of Electrical Energy, by Type of Consumer - Alberta - 1967-1981 (gigawatt hours)

	General Service*									
Year	Loads Under 5 MW	Loads Over 5 MW	Domestic & Farm	Street Lighting	Total Sales to Ultimate Customers	Used in Plants	Losses & Unaccounted For	Deliveries in Alberta	Delivered to Other Provinces	Total Deliveries
1971	4,051	1,905	2,520	156	8,631	1,141	1,176	10,947	154	**11,101**
1972	4,924	1,997	2,732	165	9,817	923	1,615	12,355	148	**12,504**
1973	5,733	2,163	2,933	181	11,011	954	1,663	13,627	123	**13,751**
1974	6,427	2,191	3,224	195	12,037	1,178	1,175	14,390	163	**14,553**
1975	6,801	1,919	3,489	204	12,413	1,405	1,428	15,246	153	**15,399**
1976	7,284	2,092	3,722	216	13,314	1,484	1,442	16,240	116	**16,356**
1977	7,549	2,499	3,959	241	14,247	1,470	1,759	17,476	396	**17,872**
1978	8,232	2,648	4,449	263	15,592	1,841	1,879	19,111	360	**19,391**
1979	8,797	4,107	4,911	253	18,067	1,157	2,091	21,316	395	**21,711**
1980	9,649	3,772	4,982	266	18,670	1,998	2,063	23,113	386	**22,469**
1981	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24,410	262	**24,672**

*Excludes sales to industrial establishments with generating and/or distributing facilities.

Table 3.16 Electric Utilities' and Industrial Establishments' Revenue from Sale of Electricity - Alberta - 1970-1980 (thousands of dollars)

	General Service*	Domestic and Farm	Street Lighting	Total Sales to Ultimate Customers	Sales to Other Provinces	Total Sales
1970	73,171	40,128	4,011	117,310	1,030	**118,340**
1971	81,979	43,335	4,219	129,533	1,225	**130,758**
1972	92,983	47,318	4,575	144,876	1,070	**145,946**
1973	113,596	53,958	5,013	172,567	339	**172,906**
1974	133,313	62,618	5,747	201,678	310	**201,988**
1975	165,151	76,805	6,679	248,635	155	**248,790**
1976	219,154	98,102	8,342	325,598	1,357	**326,955**
1977	259,818	120,500	10,814	391,132	2,476	**393,608**
1978	327,802	152,252	14,229	494,283	575	**494,858**
1979	382,206	177,148	15,732	575,086	3,929	**579,015**
1980	424,880	198,718	17,831	641,429	3,252	**644,681**

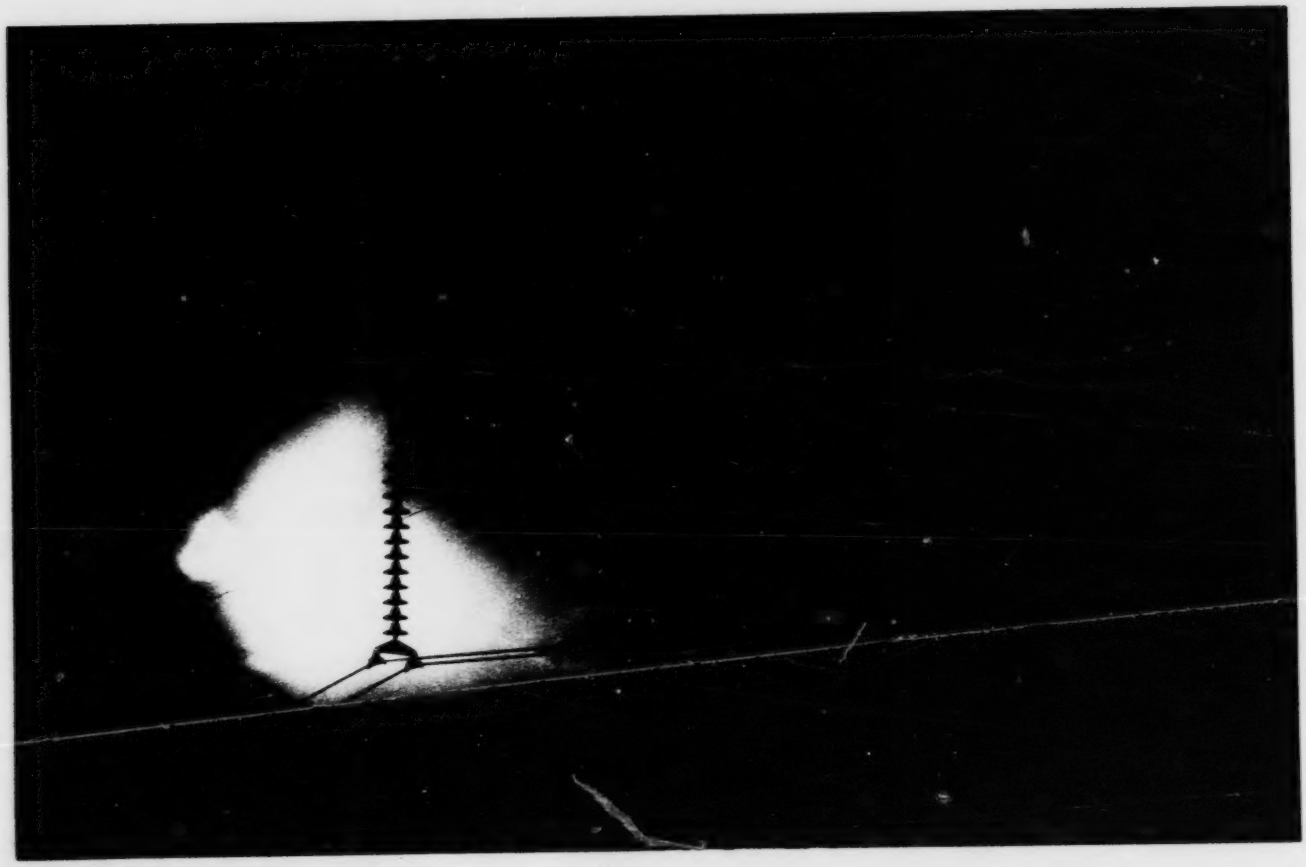
*Excludes sales to industrial establishments with generating and/or distributing facilities.

Table 3.17 Net Capacity and Net Generation by Type of Source and by Utility - Alberta - 1981

	Net Capacity (megawatts)	Net Generation (gigawatt hours)
Hydro		
Transalta Utilities Corporation	800.0	2,027.4
Alberta Power Limited	1.4	8.0
Total	**801.4**	**2,035.4**
Steam		
Transalta Utilities Corporation	2,545.0	14,279.3
Alberta Power Limited	865.0	3,670.0
City of Edmonton	977.5	2,439.9
City of Medicine Hat	55.5	171.1
Total	**4,443.0**	**20,560.3**
Gas		
Alberta Power Limited	103.1	207.6
City of Edmonton	58.0	2.2
City of Medicine Hat	81.0	325.7
Total	**242.1**	**535.5**
Internal Combustion		
Transalta Utilities Corporation	0.2	
Alberta Power Limited	36.0	31.9
City of Calgary	3.6	—
Total	**39.8**	**32.1**
Grand Total	**5,526.3**	**23,163.3**

Table 3.18 **Relative Capacity and Generation by Energy Resource and by Ownership - Alberta - 1981**

	Per cent of Capability	Per cent of Power Generated
Type of Energy Resource		
Hydro	14.5	8.8
Steam & Gas Turbine	84.8	91.1
Internal Combustion	0.7	0.1
Total	**100.0**	**100.0**
Type of Ownership		
Privately Owned	78.7	87.3
Publicly Owned	21.3	12.7
Total	**100.0**	**100.0**



Energy Conservation

Alberta is very well-endowed with energy resources. In 1938 the province established the Oil and Gas Conservation Board (now the Energy Resources Conservation Board) to regulate energy resource development and ensure that these resources would be produced in the most efficient and economic manner. The Board continues to monitor the activity of Alberta's energy production industry as a means of conserving energy resources in the field at the point of production.

There have been rapid increases in energy prices to Alberta consumers in recent years after decades of steady or declining real energy prices. The result is that energy consumers are now becoming more interested in reducing their energy use and costs.

Current energy use in Alberta is dominated by the industrial sector, which consumes almost 40 per cent of the energy used in the province. Transportation accounts for about 30 per cent of final consumption and residential use for just under 20 per cent. Commercial energy use, including government buildings, schools, hospitals, as well as offices and business, consumes the remainder.

The provincial government has established information and awareness programs to assist energy users in evaluating their technical options for reducing energy costs. Major programs are directed to homeowners and residential contractors, school teachers and students, and industrial energy users, to promote awareness of good energy management practices.

Programs of technical advice and/or financial assistance for energy conservation on farms, in school buildings and in government buildings have also been established.

The Industrial Energy Conservation Program is of special interest because it is directed to the largest energy-consuming sector in the province. A key element of this program is the provision, on request, of a free analysis of an industrial or commercial establishment's energy consumption.

The service focuses on identifying opportunities for energy savings in commercial, industrial and institutional facilities.

Results from audits conducted during the program's first full year of operation indicate that average potential savings for all facilities audited were 19 per cent of current energy costs. Most of these savings could be achieved with little or no additional capital cost.

There is no doubt that as energy prices continue to rise in Alberta, businesses will become even more interested in efficient management of their energy use.

Table 3.19 **Energy Consumption in Alberta* - 1981**

	Peta-joules	%
Industrial	373	39.2
Transportation	299	31.5
Residential	166	17.5
Commercial	112	11.8
Total	**950**	

*Energy use only. Does not include electrical conversion and transmission losses, feedstock and non-fuel use.

Transportation

Transportation

Distance from ocean ports, distance from large population concentrations, relatively large internal distances between commodity consumption or production centres, and a relatively sparse population, all combine to make Alberta industries and individuals extremely conscious of the importance of transportation to economic development and to personal convenience. Transportation costs and time are often the difference between profitability and business failure. Alberta producers have to compete with others who have readier physical access to markets, who have lower transportation costs and who can make speedier deliveries.

At the turn of the century when the province was formed, railways provided the only means for the movement of the bulk commodities — grain, livestock, forestry products, and coal — on which early economic development depended. For shorter distances, horses and horse-drawn vehicles provided the only motive power and conveyances.

By the 1940's automobiles, trucks, primitive aeroplanes were displacing equine power for the short-haul movement of persons and small-load commodities. Telephones began to replace mail as a means of communication.

By the 1980's transportation systems have been revolutionized both locally and world wide. Railways and ocean transport have been largely relegated to the long-distance transportation of bulk commodities, especially in the North American context. Today, Alberta's transportation systems are much different than they were decades ago. Trucks, automobiles and buses provide fast, convenient and low-cost transportation for goods and people over an excellent government-owned and operated road system. Railways, which own and maintain their own infrastructure, carry large volumes of bulk commodities by unit trains, high-value merchandise freight by container and piggy-back, and a relatively small but growing number of passengers by intercity and transcontinental trains.

Pipelines carry significant volumes of certain products more efficiently to continental markets. The speed and relatively low cost of aeroplane travel have made local, continental and world wide destinations readily and financially accessible to vast numbers of persons and industrial firms.

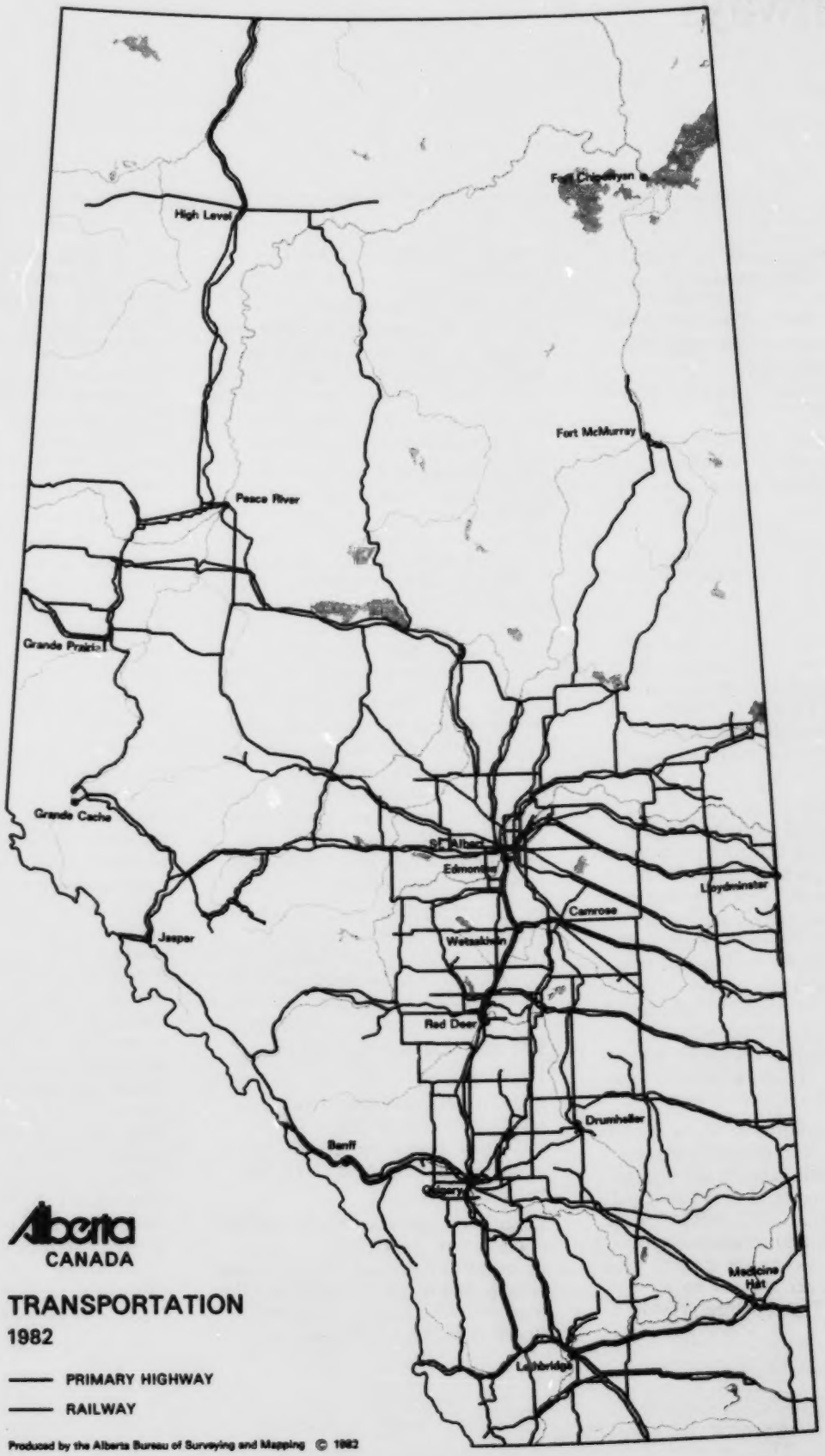
Improved refrigeration techniques have made possible the movement and distribution of enormous volume of perishable goods such as fruits and vegetables. The construction of highways and bridges has evolved to standards sufficient to cope with the immensely increased demands of modern usage and needs.

All these developments imply reductions in real and relative transportation costs and in much higher efficiency. Certain types and instances of development have almost universal impact: better engineering of power plants and vehicles; cheaper and better quality fuels; pipelining techniques; the evolution of "container" traffic, for example. Other facets of cost reductions are within the control of local authorities.

In this latter field the Alberta government is doing all in its jurisdiction to assist in the lessening or removal of natural or man-made handicaps affecting Alberta producers. An excellent high quality road and bridges system has been constructed linking all parts of the province. The initial impetus for rail extension to relatively remote areas has been supported and financed.

Air strips have been provided for use in mineral, forestry, and tourist development. Financial assistance is being provided for the improvement of ocean ports through which products must pass. Significant improvements to intercity and transcontinental passenger rail services are being studied. Practical, financial, and moral support is given in negotiations to obtain the best possible railway freight rates.

The cumulative effect of all these measures is apparent in the ever higher volumes of raw and manufactured Alberta products reaching continental and world markets.


High Level
Fort McMurray
Peace River
Grande Prairie
Grande Cache
Edmonton
Lloydminster
Camrose
Jasper
Wetaskiwin
Red Deer
Drumheller
Banff
Medicine Hat
Lethbridge
Alberta
CANADA
TRANSPORTATION
1982
PRIMARY HIGHWAY
RAILWAY
Produced by the Alberta Bureau of Surveying and Mapping © 1982

Highways

The Alberta economy has always been very closely linked with developments in transportation systems. Growth in interprovincial and intraprovincial highways has played a significant part in economic development and in transforming the life styles of Albertans.

There are currently over 14,000 kilometres of paved rural roads and highways. A continuing highways upgrading program is being undertaken by both the provincial and municipal governments. Excellent arterial roads and highways link similar main highways in the adjacent provinces of British Columbia and Saskatchewan, and south into the United States. Both the Trans-Canada Highway (through Calgary) and the Yellowhead Highway (through Edmonton) function as major 'coast to coast' routes.

Over the past two decades the development of roads and highways has played a major role in changing the growth pattern of Alberta's smaller centres. Certain towns have developed into larger service centres; others are declining in functionality and importance. Easy access to city stores and markets is often offset by the even easier access to the expanded services being offered by the larger towns. Freight trucks offer stiff competition to the railways in terms of both cost and convenience.

It is the responsibility of the Alberta Department of Transportation to construct and maintain the primary highway systems. Local municipal governments are responsible for the construction and maintenance of district roads connecting rural areas with service centres and main highways. The province provides roads where there is no local government.

The provincial government contributes financially to the costs of secondary roads in rural areas and of approved arterial thoroughfares in urban areas, although administrative jurisdiction and operation remain with the municipal governments.

The development of resources in more remote areas of the province has been encouraged by the construction of highways to centres such as Fort McMurray, Grande Cache and the Cadomin and Luscar coalfields. Forestry roads crisscross the 60 per cent of the province which is covered by forest, providing easy access to timber and other resources.

Economic and social developments within the province have a dynamic effect on the transportation demand pattern. Alberta's high level of highway service is not only due to the opening of new routes; considerable effort is required to maintain and upgrade the existing system to keep abreast of changing demands.

By 1981 there were over 150,000 kilometres of rural highways and roads in Alberta. This total broke down into the following categories: paved (14,076 kilometres), oil treated (13,016 kilometres), gravelled (99,165 kilometres), and graded (24,605 kilometres).

In 1981 there were over 1,900,000 registered motor vehicles. Of this total there were some 459,000 trucks in operation, and some 1,127,000 passenger cars.

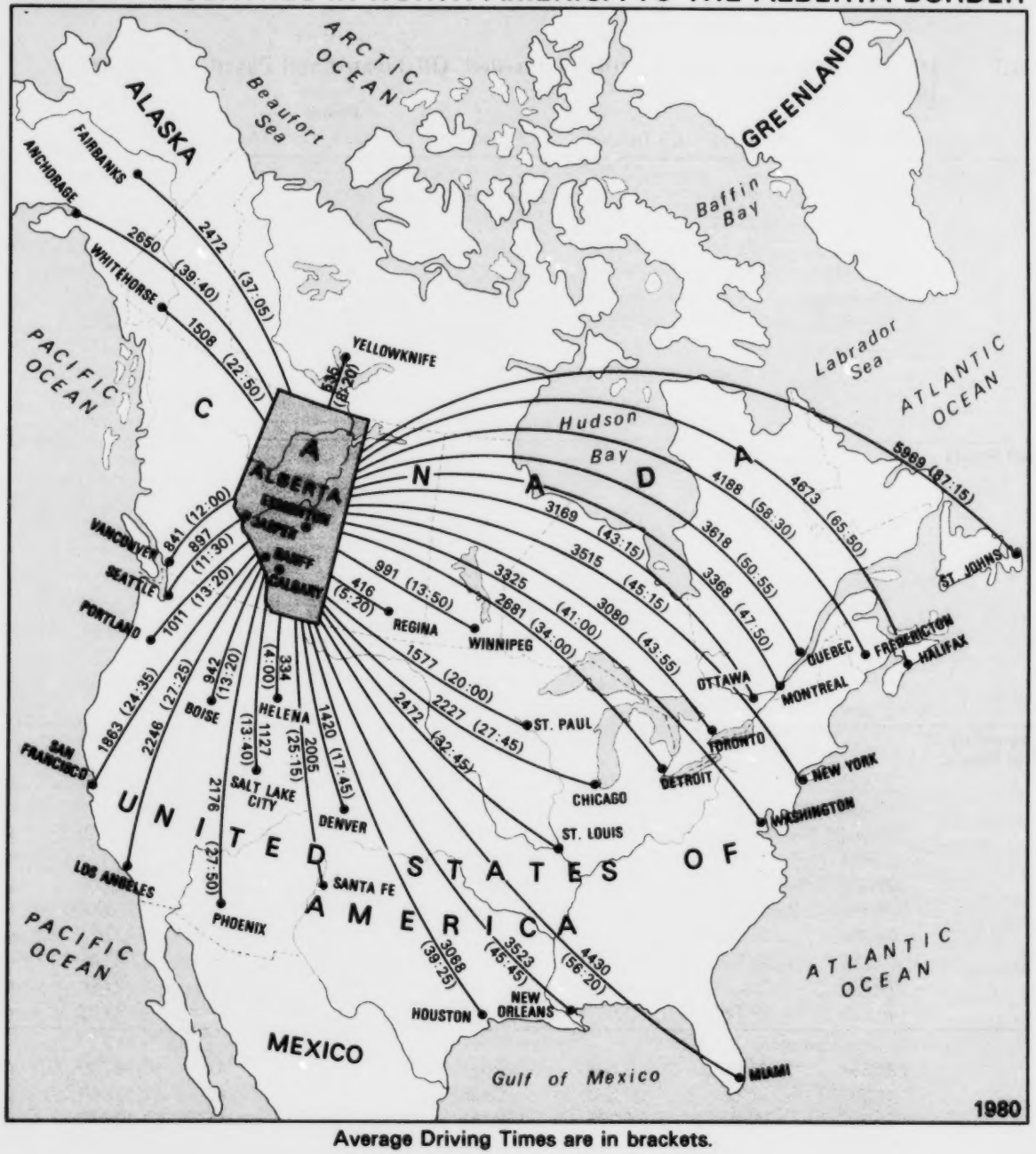
Large and small scale truck transport operators are assisted by a government policy of freedom in rate setting, and in ease of entry into the business. The Motor Transport Board is willing to consider deregulating certain currently regulated aspects of the industry. This allows competitive forces to develop, support and maintain commercial trucking services.

Private commercial trucking accounts for over 25 per cent of total cargo flow. Intermodal transportation facilities are used extensively by both shippers and truckers on long haul and import/export travel lanes.

The advanced highway infrastructure permits the trucking industry to take full advantage of new equipment technology and of maximum utilization of equipment. Highway axle weight control is of benefit to all carriers through simplification and standardization, and because of reduced deterioration of the highway network.

Several privately-owned bus companies provide scheduled passenger transportation and parcel express delivery. Their services link the cities together and provide access to most smaller communities. Approximately two million passengers are carried annually. Greyhound Lines serve the Calgary-Edmonton corridor; the Trans-Canada route through Calgary; the Yellowhead route through Edmonton; the Calgary-Lethbridge corridor; and several other routes located for the most part to the south of Calgary. Coachways System operates an extensive network of services between Edmonton and points in central and northern Alberta. Major routes are Edmonton-Grande Prairie; Edmonton-Fort McMurray; and Edmonton-Cold Lake. Pacific Western Transportation operates "Red Arrow" luxury bus services on two routes: Calgary-Edmonton and Edmonton-Fort McMurray.

DISTANCES IN KILOMETRES AND AVERAGE DRIVING TIMES FROM PRINCIPAL CENTRES IN NORTH AMERICA TO THE ALBERTA BORDER



Average Driving Times are in brackets.

Produced by the Alberta Bureau of Surveying and Mapping © 1982

Table 4.1 **Highways and Roadways, Graded, Gravelled, Oil Treated and Paved - Rural Areas - 1972-1981** (kilometres)

	Graded	Gravelled	Oil Treated	Paved				
				2-lane	4-lane	6-lane	Total	Total
Primary Highways								
1972	—	2,493	—	7,876	621	42	8,539	11,032
1973	—	2,247	—	8,105	639	48	8,792	11,038
1974	—	2,073	—	8,325	647	48	9,020	11,093
1975	—	689	1,300	8,513	597	42	9,154	11,141
1976	—	969	1,320	8,552	626	42	9,220	11,508
1977	—	1,273	1,126	8,698	626	42	9,366	11,765
1978	—	1,338	1,362	9,015	618	42	9,675	12,375
1979	—	1,265	1,586	9,190	613	42	9,845	12,696
1980	—	1,344	1,488	9,507	613	43	10,163	12,995
1981	—	1,409	1,281	9,748	613	43	10,404	13,094
Approach Roads								
1972	—	95	—	190	—	—	190	285
1973	—	93	—	201	—	—	201	295
1974	—	89	—	214	—	—	214	303
1975	—	37	42	225	—	—	225	304
1976	—	37	43	229	—	—	229	309
1977	—	34	48	219	—	—	219	301
1978	—	49	43	225	—	—	225	317
1979	—	50	42	225	—	—	225	317
1980	—	38	42	240	—	—	240	320
1981	—	30	50	240	—	—	240	320
Park, Secondary and Local Roads								
1972	27,282	95,967	3,394	1,001	—	—	1,001	127,643
1973	27,138	94,885	5,256	1,151	—	—	1,151	128,430
1974	26,987	93,968	6,909	1,252	—	—	1,252	129,116
1975	26,644	92,352	9,527	1,128	—	—	1,128	129,663
1976	27,373	93,435	10,274	1,666	—	—	1,666	132,748
1977	25,412	94,806	11,009	2,286	—	—	2,286	133,513
1978	24,781	92,265	11,330	2,351	—	—	2,351	130,727
1979	24,294	96,605	11,666	2,598	—	—	2,598	135,163
1980	24,718	96,858	11,567	2,528	—	—	2,528	135,471
1981	24,606	97,726	11,685	3,432	—	—	3,432	137,448
Total								
1972	27,282	98,554	3,394	9,067	621	42	9,730	138,960
1973	27,138	97,225	5,256	9,456	639	48	10,148	139,763
1974	26,987	96,129	6,909	9,791	647	48	10,486	140,511
1975	26,644	93,078	10,869	9,867	597	42	10,507	141,099
1976	27,373	94,441	11,637	10,446	626	42	11,114	144,485
1977	25,412	96,113	12,183	11,203	626	42	11,871	145,579
1978	24,781	93,652	12,735	11,591	618	42	12,251	143,419
1979	24,294	97,920	13,294	12,013	613	43	12,667	148,176
1980	24,718	98,040	13,097	12,275	613	43	12,931	148,786
1981	24,605	99,165	13,016	13,420	613	43	14,076	150,862

Table 4.2 Motor Vehicle Registrations by Type - Alberta - 1967-1981 (number)

	Passenger Car	Trucks	Bus	Rental Vehicles	Taxi	School Bus	Trailers	Motor-Cycles	Other*	Total
1967	442,144	177,610	935	1,893	1,158	3,497	56,368	11,615	4,663	699,883
1968	466,458	188,678	972	2,458	1,227	3,576	65,850	12,899	3,088	745,208
1969	482,375	197,893	967	2,739	1,287	3,682	75,163	14,208	3,208	781,522
1970	503,925	205,739	1,041	3,549	1,361	3,744	85,970	16,370	3,328	825,027
1971	525,524	214,120	1,062	3,485	1,411	3,764	95,595	19,393	3,376	867,730
1972	552,854	227,008	1,092	3,639	1,420	3,789	106,090	23,593	3,275	922,760
1973	582,167	246,440	1,199	4,644	1,588	3,831	117,029	24,528	3,504	984,930
1974	620,480	273,548	1,294	5,773	1,678	3,872	132,454	27,028	3,893	1,070,020
1975	690,330	318,932	1,558	8,199	1,788	4,032	148,181	32,269	4,238	1,209,527
1976	704,743	319,193	1,698	7,202	1,794	4,020	154,362	29,621	5,790	1,228,423
1977	760,861	335,568	1,993	7,537	1,749	1,173	171,584	31,586	6,975	1,319,026
1978	855,419	370,600	2,154	6,991	2,005	4,206	184,196	33,861	7,848	1,467,280
1979	949,233	405,679	2,360	8,622	2,429	4,206	204,277	40,644	8,780	1,626,230
1980	1,026,502	438,890	2,440	11,546	2,826	4,488	214,836	44,722	10,885	1,757,135
1981	1,126,990	458,881	2,773	13,357	3,208	4,632	233,227	52,987	10,969	1,906,984

*Other includes pole trailers and dealers.

Aviation

Aviation services have played a major role in the development of Alberta's economy. As the economy matures and its base diversifies, this role will likely assume even greater importance.

Over 7 million passengers passed through Alberta's three major airports (Edmonton International, Edmonton Municipal and Calgary International) during 1980. This represents an almost four-fold increase in passenger traffic in the ten years since 1970. In this same period, services available to Alberta travellers have developed to include connections with the Pacific Rim countries and improvements to connections to the United States, the United Kingdom and Europe. Charter and corporate aviation has also grown to service oil and gas exploration and development, and executive travel demands. The volume of air cargo and mail traffic has risen from about 24 million to over 66 million kilograms. The growth in demand for services has resulted in major expansions and improvements to air cargo handling facilities at Alberta's International Airports.

In addition to 82 licensed airports, 28 heliports, and 8 seaplane bases, Alberta has over 800 unlicensed airports which range from grass strips to hard surfaced runways. Calgary and Edmonton International Airports are capable of accommodating all classes of service, both international and domestic. Both airports provide pre-clearance customs facilities for flights to points in the United States.

Air Canada and CP Air provide Alberta with transcontinental service and along with Republic, Western, and Northwest Orient Airlines connect Alberta with points in the United States. Both Air Canada and CP Air connect Alberta with Europe via the polar route, thereby keeping transit times comparable to those between Ontario/Quebec and Europe. Pacific Western Airlines (PWA) a regional air carrier, provides service within western Canada as well as serving the Arctic and central Canada. Time Air, a commuter carrier, serves Alberta and B.C.; Southern Frontier Air Transport Ltd. offers service between Alberta's major centres and smaller communities. Wardair, Canada's largest charter air firm, provides both domestic and international charter services.

Table 4.3 **Landings Plus Take-offs, Itinerant and Local Flights, Selected Airports - Alberta - 1971-1981** (number)

	1971	1976	1977	1978	1979	1980	1981
Calgary International	180,009	199,774	208,170	196,576	225,619	235,422	233,205
Edmonton Municipal	175,825	279,867	213,060	193,593	201,036	194,883	185,965
Edmonton International	84,812	99,504	91,850	87,079	100,194	99,913	94,949
Footner Lake	9,399	8,474	9,878	15,674	11,839	17,057	19,103
Fort Chipewyan	—	6,213	5,699	5,982	8,910	5,637	5,549
Fort McMurray	9,484	46,026	52,441	47,835	55,386	46,886	62,843
Grande Prairie	38,496	37,514	45,540	57,122	68,018	78,674	71,825
Lac La Biche	2,358	810	N/A	N/A	N/A	N/A	N/A
Lethbridge	50,540	73,570	64,792	55,300	56,741	50,280	57,160
Medicine Hat	13,885	47,101	34,466	27,379	25,411	26,252	31,584
Peace River	16,553	26,436	29,452	30,284	26,400	23,471	28,262
Rainbow Lake	3,444	1,338	803	590	882	3,251	3,055
Red Deer	43,858	55,396	57,112	49,678	51,714	57,812	56,879
Springbank	142,709	203,467	201,508	207,275	241,148	227,702	232,058
Vermilion	1,396	12,376	16,107	13,613	10,252	9,913	12,440
Whitecourt	3,509	17,453	10,872	16,385	18,230	22,083	20,620

These statistics show the total of lands and take-offs of itinerant and local flights. A local movement is one in which the aircraft remains at all times within the airport tower control zone, an itinerant movement is one in which the aircraft enters or leaves the airport tower control zone.

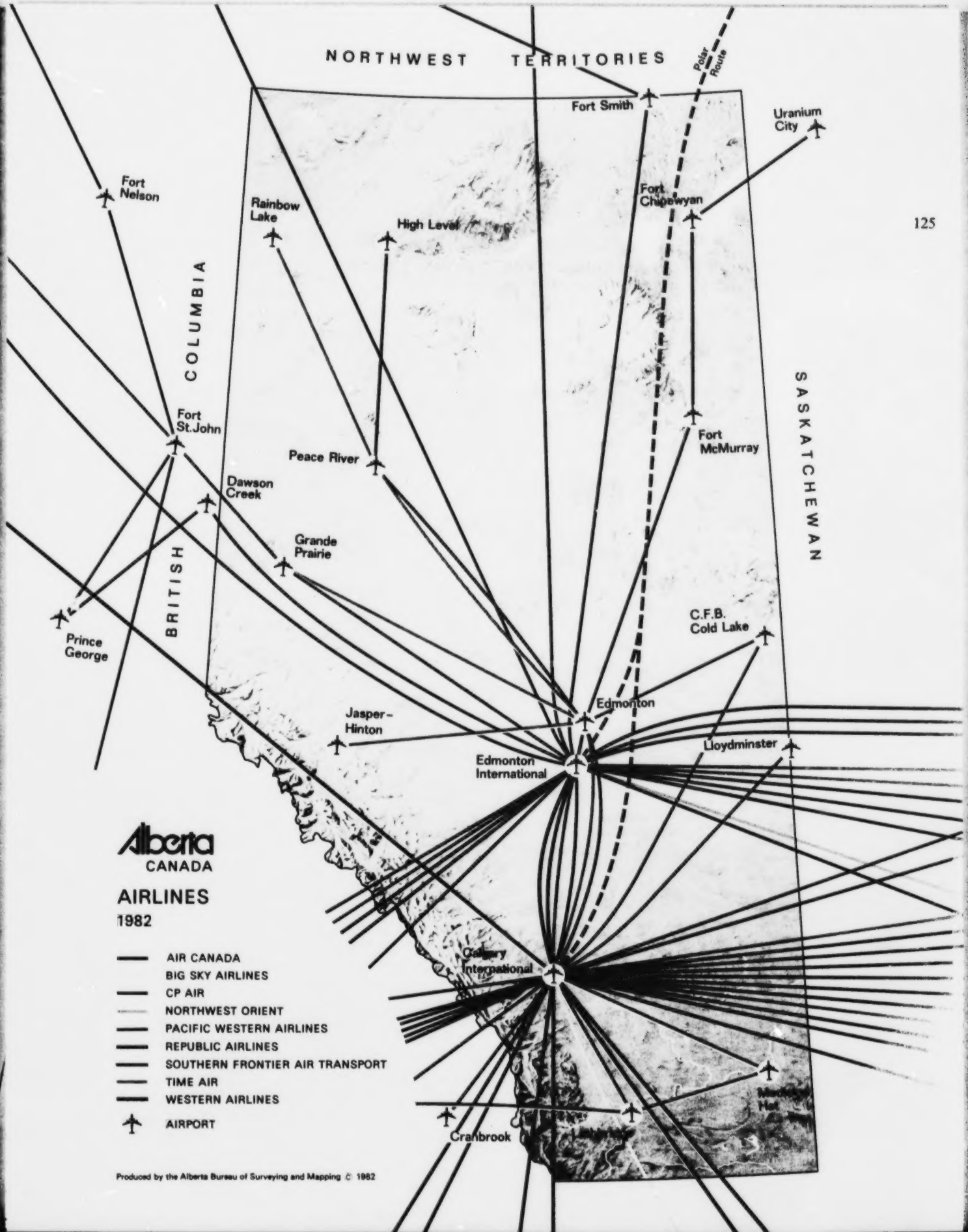

NORTHWEST TERRITORIES
Polar Route
Fort Smith
Uranium City
Fort Nelson
Rainbow Lake
High Level
Fort Chipewyan
COLUMBIA
SASKATCHEWAN
Fort St.John
Peace River
Fort McMurray
Dawson Creek
Grande Prairie
BRITISH
Prince George
C.F.B. Cold Lake
Edmonton
Jasper-Hinton
Lloydminster
Edmonton International
Alberta
CANADA
AIRLINES
1982
AIR CANADA
BIG SKY AIRLINES
CP AIR
NORTHWEST ORIENT
PACIFIC WESTERN AIRLINES
REPUBLIC AIRLINES
SOUTHERN FRONTIER AIR TRANSPORT
TIME AIR
WESTERN AIRLINES
AIRPORT
Calgary International
Medicine Hat
Cranbrook
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Table 4.4 **Number of Passengers Enplaned Plus Deplaned, Scheduled Airline Flights - Edmonton and Calgary Airports - 1964-1980** (thousands)

	Edmonton International	Edmonton Municipal	Calgary International
1964	300	96	465
1965	357	138	555
1966	393	189	672
1967	472	225	828
1968	522	247	918
1969	538	298	1,060
1970	585	367	1,203
1971	605	387	1,262
1972	709	456	1,415
1973	885	580	1,833
1974	1,138	635	2,079
1975	1,366	607	2,218
1976	1,443	575	2,297
1977	1,582	696	2,593
1978	1,752	763	2,926
1979	2,112	853	3,585
1980	2,399	923	4,031

Table 4.5 **Deplaned Plus Enplaned Airmail and Cargo Freight - Calgary and Edmonton Airports - 1964-1980** (thousands of kilograms)

	Edmonton International		Edmonton Municipal		Calgary International	
	Mail	Cargo	Mail	Cargo	Mail	Cargo
1964	2,320	2,126	625	2,197	1,489	2,081
1965	2,486	3,197	702	3,288	1,611	2,493
1966	1,757	3,850	787	2,509	1,531	3,631
1967	1,830	4,490	800	2,834	1,938	3,967
1968	2,177	6,132	888	2,748	2,004	5,226
1969	2,787	5,909	922	3,223	2,791	6,631
1970	2,338	6,059	870	3,543	2,222	7,935
1971	2,606	8,374	875	3,890	2,598	9,140
1972	2,532	8,354	968	4,658	2,580	9,575
1973	3,352	11,505	1,017	4,399	3,039	12,398
1974	4,169	15,969	621	3,378	3,423	13,835
1975	3,906	17,248	274	3,052	3,089	14,039
1976	5,243	18,331	211	2,149	3,917	16,751
1977	6,013	20,092	223	2,266	4,377	17,734
1978	8,187	24,837	215	1,428	4,581	19,450
1979	7,047	24,024	250	1,701	5,424	23,407
1980	6,899	28,054	196	1,950	6,302	23,126

Railways

The completion of the Canadian Pacific Railway in 1885 opened Alberta for major economic development. Since that time, the railways have been an essential element of economic growth.

Resource development necessitated the establishment of other regional rail lines. The Northern Alberta Railway (NAR), recently purchased by the CNR, services the Peace River block and has a line northeast to Fort McMurray from Edmonton. A freight-only line runs to Dawson Creek, British Columbia.

The Alberta Resources Railway, owned by the Alberta government, was completed in 1969. It was conceived primarily to accelerate the development of the natural resources of coking coal, gypsum, pulp wood, timber, petroleum, natural gas, and sulphur in the area lying north of Hinton on the CNR mainline and south of the Peace River block. To date, mainly coal mining has been assisted — some 3 million tonnes being moved annually from Grande Cache through the Neptune coal terminal at Vancouver to Japanese and other overseas markets.

A railway line linking the NAR with Hay River and the Pine Point lead-zinc mines of the Northwest Territories, was completed in 1969 by the CNR with federal government financial assistance. It is an important factor in the economic development of the Mackenzie Valley and the Arctic Coast. Large volumes of northbound equipment and material pass through the railhead at Hay River for shipment by barge along the Mackenzie River system.

VIA Rail Canada Inc. utilizes CNR and CPR trackage in Alberta to provide four rail passenger services: The daily transcontinental on the CPR route through Calgary; a daily Edmonton-Saskatoon on the CNR; the tri-weekly Edmonton-Prince Rupert on the CNR; and a twice-daily Calgary-Edmonton on the CPR. The transcontinental carries approximately 130,000 passengers annually through Alberta. The Edmonton-Saskatoon and Edmonton-Prince Rupert trains handle roughly 15,000 and 16,000 passengers respectively, in comparison with the 125,000 annual passengers formerly carried through Alberta by the Toronto-Vancouver train which was discontinued in 1981.

The Calgary-Edmonton service carries approximately 43,000 passengers annually. The government is sponsoring a series of studies into the future potential of a frequent, downtown-to-downtown high-speed service between the two cities. The other VIA services are important to Alberta both for the basic transportation links they provide to other parts of Canada and for tourism to the Banff and Jasper townsites.

The CNR operates twice-weekly mixed freight-passenger services between Edmonton-Lac La Biche and Lac La Biche-Fort McMurray, providing the only surface transportation link to several communities in northeastern Alberta.

Intermodal yards have been developed by the railway companies in the major cities. The CNR operates one of the most modern near Fort McMurray, specifically designed for local purposes. It currently handles about 200,000 tonnes per year, although capacity is more than double that figure.

The railways are essential to the movement of bulk commodities such as grains, timber products, coal, sulphur, and other mine products to world markets. Bulky processed and manufactured products, particularly for long hauls, are well handled. Industrial developments in northern Canada and northern Alberta are especially contingent on adequate rail service, but all areas of the province require this mode of transport for the maintenance and continuation of balanced growth.

Water Transport

Many Alberta products are delivered to customers outside the province by a combination of overland and marine transport. Water transport is important to Alberta industries because it allows bulk and packaged products to be moved to distant customers in northern Canada and overseas at relatively low cost.

Freight originating in Alberta is transported on inland waterways and on major ocean trade routes. The most important inland waterways serving Alberta are the Mackenzie River, which moves Alberta cargoes as far north as the Beaufort Sea, and the St. Lawrence Seaway, which transports goods to the eastern United States, to Europe, and to the near eastern countries.

The Mackenzie River system, ice free only four months of the year, flows some 1,770 kilometres north from Great Slave Lake to the Beaufort Sea in the Canadian Arctic. During the 1981 shipping season, 165,000 tonnes of cargo were transported down the river on shallow draft barges. Just over half of this tonnage represents community resupply shipments, while the remainder is project freight related to the increasing amount of exploration for oil and gas underway in the region. A significant portion of the freight moving on the Mackenzie River is transshipped through Alberta.

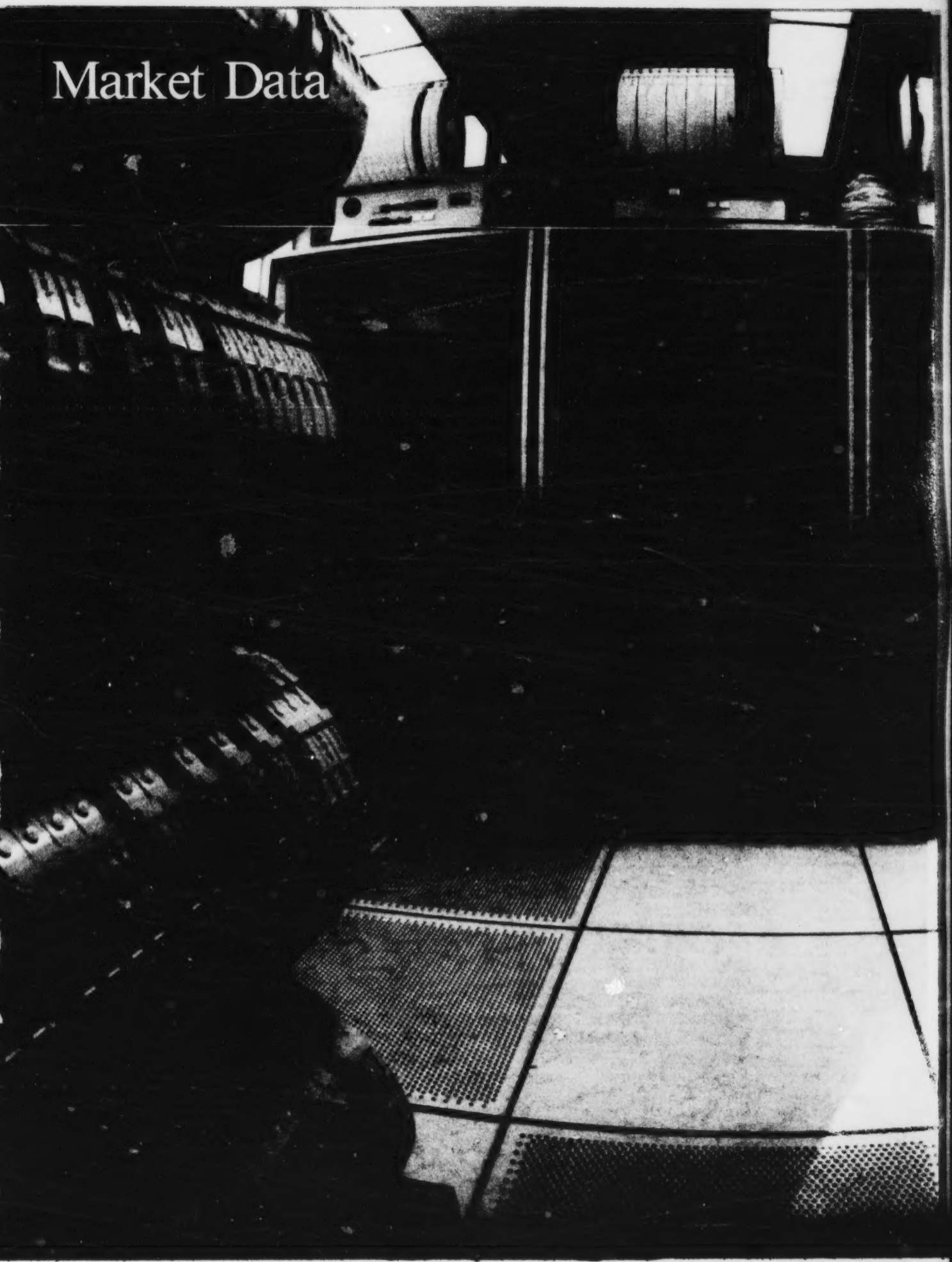
Cargoes are usually consolidated in Edmonton and forwarded by rail or truck to Hay River, N.W.T., the main staging area for barging operations. The amount of tonnage moving on the Mackenzie River route is expected to increase dramatically during the next ten years as mining and petroleum developments accelerate in the Northwest Territories and on the Beaufort Sea.

Alberta products move to overseas markets primarily through the Ports of Vancouver and Prince Rupert in British Columbia, through the Port of Thunder Bay on Lake Superior and the Port of Montreal in Quebec. Ocean going vessels carry grain, coal, sulphur, (about 21 million tonnes in 1981), and a variety of other agricultural and manufactured products from Alberta. Many of these commodities have unfavourable value to weight ratios, and are therefore particularly sensitive to the total cost of transportation to their final market destinations. The availability of efficient, low cost marine transport allows products to be sold in distant markets at competitive delivered prices.

Table 4.6 Northbound Water Freight Shipped Via Fort McMurray and Hay River - 1961-1982

	Ft. McMurray (tonnes)	Hay River (tonnes)	Total (tonnes)
1961	23,369	36,134	59,503
1962	56,460	33,726	90,186
1963	55,973	34,895	90,869
1964	55,111	43,439	98,550
1965	49,130	36,809	85,939
1966	39,264	30,241	69,504
1967	39,272	33,283	72,555
1968	46,825	58,398	105,223
1969	34,647	110,935	145,582
1970	31,288	125,581	156,869
1971	33,493	108,976	142,469
1972	24,943	224,056	248,999
1973	23,071	166,195	189,266
1974	39,637	172,995	212,632
1975	35,174	197,503	240,842
1976	36,959	155,592	192,551
1977	53,988	106,000	159,988
1978	58,391	117,280	175,671
1979	69,716	122,589	192,305
1980	50,211	138,399	188,610
1981	46,499	164,940	211,439
1982	14,850	177,344	192,194

Market Data



Personal Income Tax Data

The data in this section were compiled from individuals' personal income tax returns. Since the returns show place of residence, occupation, and employer, it is possible to obtain much detailed information on annual and regional bases. Relative affluence, growth or stagnation, within census divisions, and changes in average incomes of occupational groupings, are shown. Reasons for some of the fluctuations and changes can only be inferred from knowledge of local and economic events for specific years. The general pace of economic growth and inflation can be observed.

Since 1971, Alberta's total personal income has more than quadrupled to reach $17.2 billion in 1979. Seventy per cent of this income was earned in census divisions 6 and 11, which include the province's two major cities, Calgary and Edmonton. The largest and most important component of personal income has been labour income (wages and salaries) which accounted for 74.7 per cent of the 1979 total.

Per capita personal income increased from $2,512 in 1971 to $8,489 in 1979. During this period, the greatest per capita increase in average income was recorded in census division 12 — a reflection of the growth of Fort McMurray and of the initial industrial development related to the oil sands processing plants.

Between 1971 and 1979, the average income of taxable Albertans more than doubled to reach $18,739. In 1979, professionals recorded the highest average income — $34,227.

Over the 1971-79 period, however, property owners and investors experienced a five-fold increase in average annual incomes. It is difficult to determine the changes in real incomes, but it is likely that the increases more than offset the inflation during the period.

Of the total Alberta taxfilers in 1979, 53.2 per cent reported an income exceeding $10,000, while 21.5 per cent reported an income of $20,000 and over.

In 1979, over half of the declared personal income of Alberta taxfilers was earned by persons less than 38. One quarter was earned by taxfilers 27 years of age and younger.

Table 5.1 **Total and Per Capita Reported Taxable and Non-Taxable Income by Census Division - Alberta - 1961, 1971, 1979** (totals in millions of dollars; per capita in dollars)

Census Division	1961 Total	1961 Per Capita	1971 Total	1971 Per Capita	Change Per Capita 1961-1971 (%)	1979 Total	1979 Per Capita	Change Per Capita 1971-1979 (%)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
Total Alberta	**1,514.0**	**1,137**	**4,089.2**	**2,512**	**120.9**	**17,158.9**	**8,489**	**237.9**

Table 5.2 Average Income of Taxable Persons, by Occupational Classes - Alberta - 1971 and 1973-1979 (dollars)

	1971	1973	1974	1975	1976	1977	1978	1979
Employees of Business								
Employees of Institutions								
Teachers & Professors								
Federal Employees								
Provincial Employees								
Municipal Employees								
Armed Forces								
Unclassified								
Average — Employees	7,166	8,425	9,719	12,373	13,831	15,004	16,511	17,746
Farmers								
Fishermen								
Average — Farmers & Fishermen	6,291	9,645	N/A	N/A	16,832	N/A	18,800	21,572
Accountants								
Medical Doctors & Surgeons								
Dentists								
Lawyers & Notaries								
Engineers & Architects								
Entertainers & Artists								
Other Professionals								
Average — Professionals	24,403	26,010	29,047	33,247	36,417	31,789	33,710	34,227
Salesmen								
Forestry Operators								
Manufacturers								
Construction								
Public Utilities								
Wholesale Traders								
Retail Traders								
Insurance Agency Operators								
Real Estate Agency Operators								
Other Finance								
Recreational Services Operators								
Business Services Operators								
Other Service Operators								
Other Business Proprietors								
Average — Business Proprietors	7,246	8,770	11,039	13,980	14,693	16,392	18,476	19,581
Investors								
Property Owners								
Average — Investment	6,580	8,920	11,947	16,836	19,334	21,758	28,336	32,818
Pensioners								
Unclassified								
Average — All Occupations	7,189	8,570	10,112	12,959	14,323	15,469	17,214	18,739

Note: A Provincial Legislative Act passed in 1976 allowed for the establishment of professional corporations. This accounts for the drop in 1977 income shown for many of the professional occupation categories.

Table 5.3 **Distribution of All Taxfilers Returns (Taxable and Non-Taxable) by Sources of Income - Alberta and Major Cities - 1972-1979** (millions of dollars)

Taxation Year	Total Number of Returns	Wages & Salaries	Commissions & Other Employment Earnings	Family Allowances	Unemployment Insurance Benefits	Old Age, CPP or Other Pensions	Net Business Income	Net Profess. Income	Net Commiss. Income	Net Farming or Fishing Income	Taxable Amounts of Dividends	Bond & Bank Interest	Mortgage Interest
Edmonton													
1972													
1973													
1974													
1975													
1976													
1977													
1978													
1979													
Calgary													
1972													
1973													
1974													
1975													
1976													
1977													
1978													
1979													
Lethbridge													
1972													
1973													
1974													
1975													
1976													
1977													
1978													
1979													
Medicine Hat													
1972													
1973													
1974													
1975													
1976													
1977													
1978													
1979													
Red Deer													
1972													
1973													
1974													
1975													
1976													
1977													
1978													
1979													
Alberta													
1972													
1973													
1974													
1975													
1976													
1977													
1978													
1979													

Income From Trusts	Annuity & Other Cdn. Investment Income	Foreign Investment Income	Net Rental Income	Net Taxable Capital Gains	Miscellaneous Income	Total Income Assessed

Table 5.4 **Number of Taxfilers by Income Classes - Alberta and Major Cities - Selected Years - 1965-1979** (includes taxable plus non-taxable taxfiler returns) (thousands)

Income Classes	1965	1971	1972	1973	1974	1975	1976	1977	1978	1979
Alberta										
Under $1,000										
$1,000 - $5,000										
$5,000 - $10,000										
$10,000 - $20,000										
$20,000 and over										
Total Taxfilers										
Calgary										
Under $1,000										
$1,000 - $5,000										
$5,000 - $10,000										
$10,000 - $20,000										
$20,000 and over										
Edmonton										
Under $1,000										
$1,000 - $5,000										
$5,000 - $10,000										
$10,000 - $20,000										
$20,000 and over										
Lethbridge										
Under $1,000										
$1,000 - $5,000										
$5,000 - $10,000										
$10,000 - $20,000										
$20,000 and over										
Medicine Hat										
Under $1,000										
$1,000 - $5,000										
$5,000 - $10,000										
$10,000 and over										
Red Deer										
Under $1,000										
$1,000 - $5,000										
$5,000 - $10,000										
$10,000 and over										

Table 5.5 **Number of Taxable Returns, Average Taxable Income, Total Taxable Income - Alberta Cities - Specified Years - 1971-1979**

City	Year	Taxpayers No.	Total Taxable Income $000,000	Average Taxable Income $	Rank in Canada
Calgary	1971				21
	1973				21
	1975				11
	1977				11
	1979				3
Camrose	1971				—
	1973				—
	1975				—
	1977				—
	1979				—
Drumheller	1971				—
	1973				—
	1975				—
	1977				—
	1979				—
Edmonton	1971				—
	1973				—
	1975				—
	1977				—
	1979				—
Fort McMurray	1971				—
	1973				—
	1975				—
	1977				—
	1979				—
Grande Prairie	1971				—
	1973				—
	1975				—
	1977				—
	1979				—
Lethbridge	1971				—
	1973				—
	1975				—
	1977				—
	1979				—
Lloydminster**	1971				—
	1973				—
	1975				—
	1977				—
	1979				—

City	Year	Taxpayers No.	Total Taxable Income $000,000	Average Taxable Income $	Rank in Canada
Medicine Hat	1971				
	1973				
	1975				
	1977				
	1979				
Red Deer	1971				
	1973				
	1975				
	1977				
	1979				
St. Albert	1976				
	1977				
	1978				
	1979				
Wetaskiwin	1971				
	1973				
	1975				
	1977				
	1979				

* Not available.
** 1971 - 1977: Both Alberta and Saskatchewan portions; 1979 Alberta portion only.

Table 5.6 Numbers and Declared Personal Income of Taxfilers by Ages - Alberta - 1975-1979 (Number figures in thousands - Income figures in millions of dollars)

Age	1975 Number	1975 Income	1976 Number	1976 Income	1977 Number	1977 Income	1978 Number	1978 Income	1979 Number	1979 Income
Under 21										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										

Age	1975 Number	1975 Income	1976 Number	1976 Income	1977 Number	1977 Income	1978 Number	1978 Income	1979 Number	1979 Income
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
69										
70										
Over 70										
Not Stated										
Total	**652.5**	**8,455.4**	**980.4**	**10,936.3**	**1,027.9**	**12,422.6**	**1,186.0**	**14,513.4**	**1,261.0**	**17,565.8**

Note: Figures may not add due to rounding.

Retail Trade

One measure of prosperity or affluence and of changing emphases in buying habits is evident from retail trade figures. In recent years, the impact and, to an even greater extent, the uneven impact of inflation on costs and prices has clouded perception of real changes. The price of a unit package of goods and services may vary from province to province, and within provinces, because of differences in distribution costs, of differences in needs or habits, of local differences in production costs, of competitive factors, or simply because sellers take advantage of the relative prosperity of areas to maximize their incomes and turnover. Thus interregional and interclassificational comparisons of sales may not be as meaningful as raw figures would indicate.

Apparent retail trade volume in Alberta quadrupled between 1972 and 1981 although the population only rose by approximately 600,000. Much of the increase was caused by inflation; the consumer price index rose from 104.6 to 238.5 over the period, making it difficult to estimate the actual increases in physical volumes. Rising personal incomes were the primary force behind this growth.

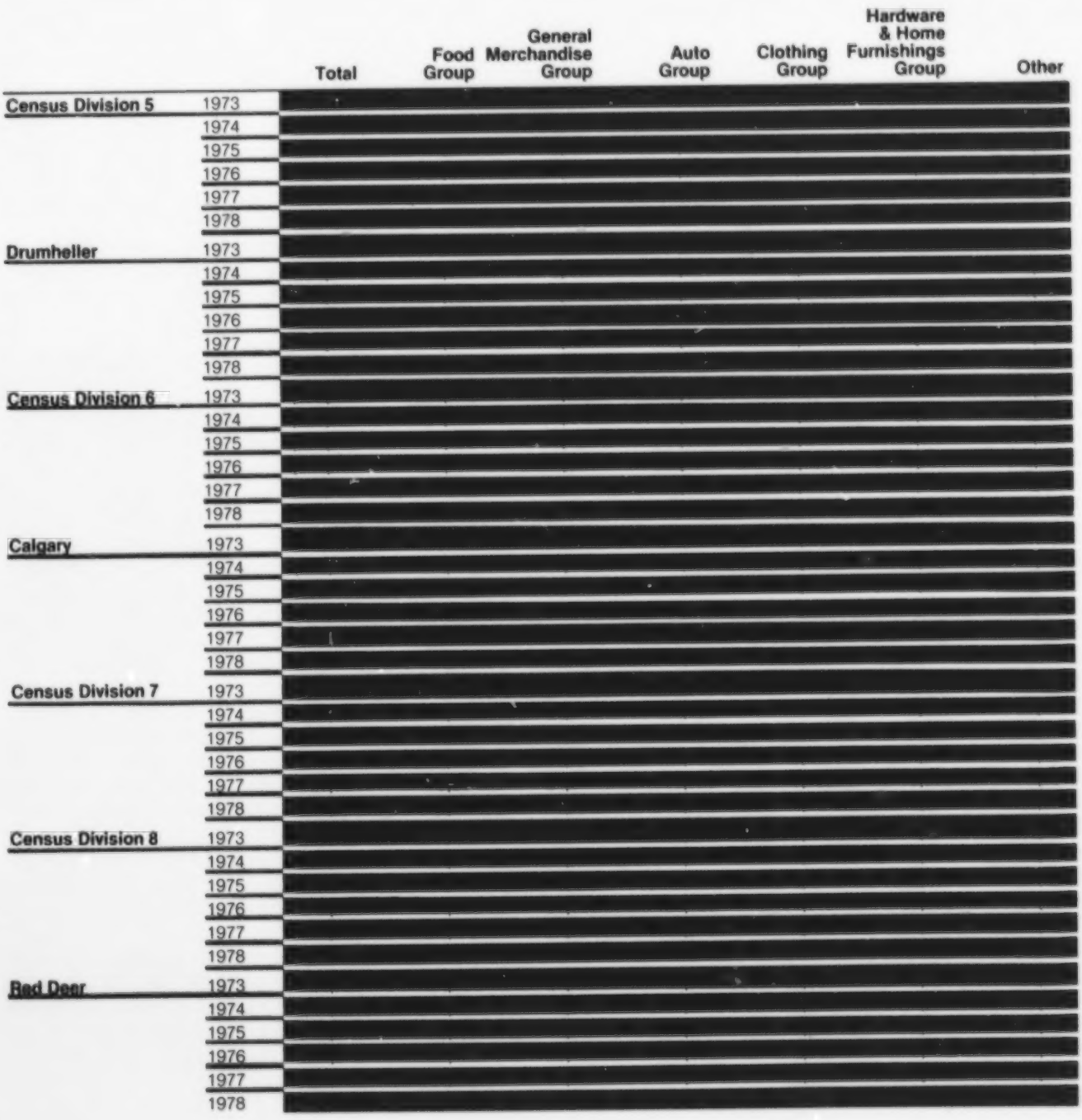
Volume and type of store sales by Alberta census divisions are also shown. The divisions in which Calgary and Edmonton are situated and which contain over half the population of the province account for nearly two-thirds of sales. In general, rankings of divisions by population and sales volume are similar, although per capita sales in southern Alberta tend to be slightly higher.

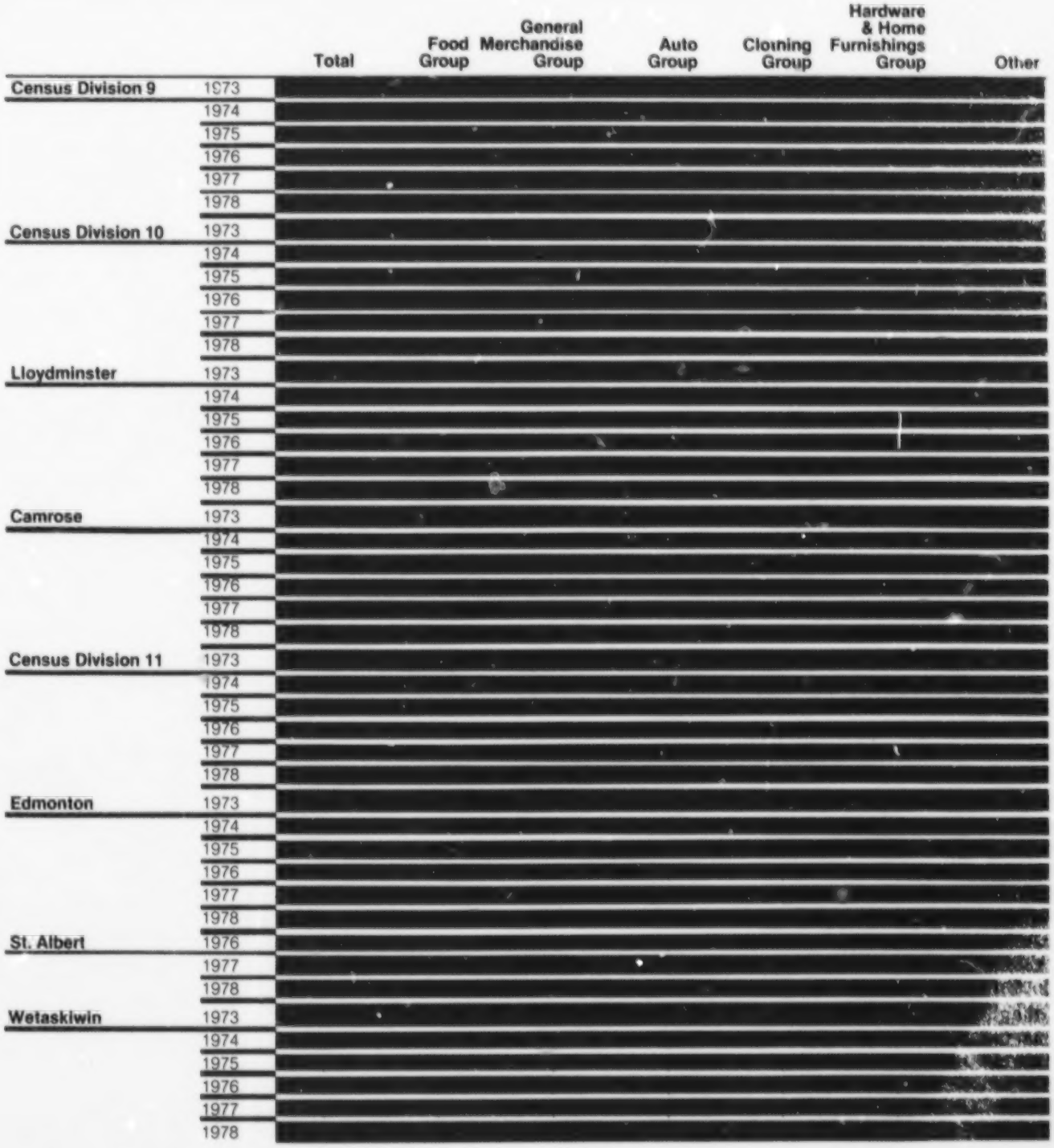
Table 5.7 **Retail Trade by Type of Outlet - Alberta - 1972 and 1977-1981** (millions of dollars)

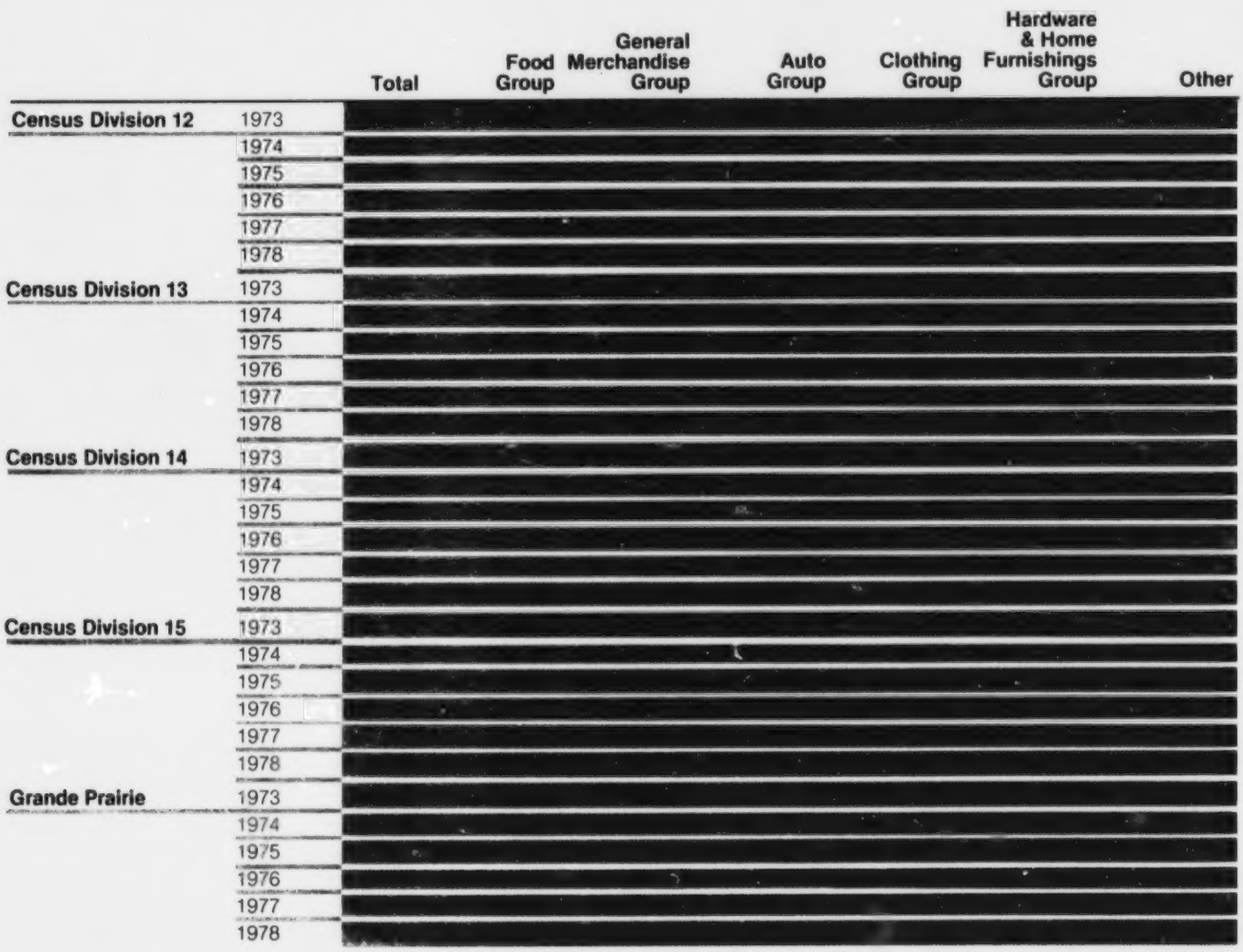
Type of Store	1972	1977	1978	1979	1980	1981
Combination Stores (Grocery & Meat)						
Grocery, Confectionery & Sundries Stores						
All Other Food Stores						
Department Stores						
General Merchandise Stores						
General Stores						
Variety Stores						
Motor Vehicle Dealers						
Used Car Dealers						
Service Stations						
Garages						
Automotive Parts & Accessories						
Men's Clothing Stores						
Women's Clothing Stores						
Family Clothing Stores						
Specialty Shoe						
Family Shoe Stores						
Hardware Stores						
Household Furniture Stores						
Household Appliance Stores						
Furniture, T.V., Radio & Appliance Stores						
Pharmacies, Patent Medicine & Cosmetic						
Book & Stationery Stores						
Florists						
Jewellery Stores						
Sporting Goods & Accessories Stores						
Personal Accessories Stores						
All Other Stores						
Total	2,728.3	5,923.7	6,793.2	8,052.8	9,410.7	10,906.4

Table 5.8 **Retail Trade by Major Groups - Census Division and Cities* - 1973-1978** (thousands of dollars)

		Total	Food Group	General Merchandise Group	Auto Group	Clothing Group	Hardware & Home Furnishings Group	Other
Census Division 1	1973							
	1974							
	1975							
	1976							
	1977							
	1978							
Medicine Hat	1973							
	1974							
	1975							
	1976							
	1977							
	1978							
Census Division 2	1973							
	1974							
	1975							
	1976							
	1977							
	1978							
Lethbridge	1973							
	1974							
	1975							
	1976							
	1977							
	1978							
Census Division 3	1973							
	1974							
	1975							
	1976							
	1977							
	1978							
Census Division 4	1973							
	1974							
	1975							
	1976							
	1977							
	1978							


Total
Food Group
General Merchandise Group
Auto Group
Clothing Group
Hardware & Home Furnishings Group
Other
Census Division 5
1973
1974
1975
1976
1977
1978
Drumheller
1973
1974
1975
1976
1977
1978
Census Division 6
1973
1974
1975
1976
1977
1978
Calgary
1973
1974
1975
1976
1977
1978
Census Division 7
1973
1974
1975
1976
1977
1978
Census Division 8
1973
1974
1975
1976
1977
1978
Red Deer
1973
1974
1975
1976
1977
1978


Total
Food Group
General Merchandise Group
Auto Group
Clothing Group
Hardware & Home Furnishings Group
Other
Census Division 9
1973
1974
1975
1976
1977
1978
Census Division 10
1973
1974
1975
1976
1977
1978
Lloydminster
1973
1974
1975
1976
1977
1978
Camrose
1973
1974
1975
1976
1977
1978
Census Division 11
1973
1974
1975
1976
1977
1978
Edmonton
1973
1974
1975
1976
1977
1978
St. Albert
1976
1977
1978
Wetaskiwin
1973
1974
1975
1976
1977
1978



*Due to changes in the categorization used between 1973-1974 and 1975-1976, interyear comparisons may be misleading

Table 5.9 **Cheques Cashed in Clearing Centres by Type of Account - Alberta - 1970-1981** (millions of dollars)

Type and Year	Calgary	Edmonton	Lethbridge	Medicine Hat	Total 4 Centres
Current					
1970					
1971					
1972					
1973					
1974					
1975					
1976					
1977					
1978					
1979					
1980					
1981					
Savings					
1970					
1971					
1972					
1973					
1974					
1975					
1976					
1977					
1978					
1979					
1980					
1981					
Personal Chequing					
1970					
1971					
1972					
1973					
1974					
1975					
1976					
1977					
1978					
1979					186
1980					100
1981					317

Type and Year	Calgary	Edmonton	Lethbridge	Medicine Hat	Total 4 Centres
Total Cheques Cashed					
1970					
1971					
1972					
1973					
1974					
1975					
1976					
1977					
1978					
1979					
1980					
1981					

NOTE: Component items may not add to total due to rounding.

Consumer Price Indices

The consumer price index (C.P.I.) is based on the cost of a fixed, commonly purchased "basket of goods and services" as determined during some specified time period. Costs of the various items of the basket change at different rates over time; they also change at different rates from city to city. The weights assigned to the items in the basket of goods and services were last updated in 1978 for selected cities and Canada as a whole.

It is to be noted that comparative intercity living costs cannot be determined from the tables in this publication. The 1978 base cost of the basket in say, Montreal, may have been much higher (or lower) than the cost of the identical basket in, say, Calgary. The C.P.I. measures the changes in each city independently. The annual percentage change for each city index measures the price movements, or the rate of inflation, in that city.

Nor should it be assumed that component index changes have an even impact on everyone. For example, the changes in the housing price index, measure only the effects on the renters and home buyers: relatively unaffected are the home owners who have clear title to their residences.

The consumer price index measures the effect of ordinary price changes on typical ordinary citizens. Strictly speaking it is not valid to apply it to specific industries. For example, steel products industry costs may change at radically different rates from those of the chemical or wood products industries, due to completely different national or international competitive and cost factors. In very general terms, some of the disparities in industry incidence may be observed in the Industry Selling Price Indexes table.

Table 5.10 **Consumer Price Index, All Items - Canada - 1914-1981** (1971 = 100)

Year	Index	Year	Index	Year	Index

Table 5.11 **Component Group Indexes of the Consumer Price Index - Canada - 1967-1981** (1971 = 100)

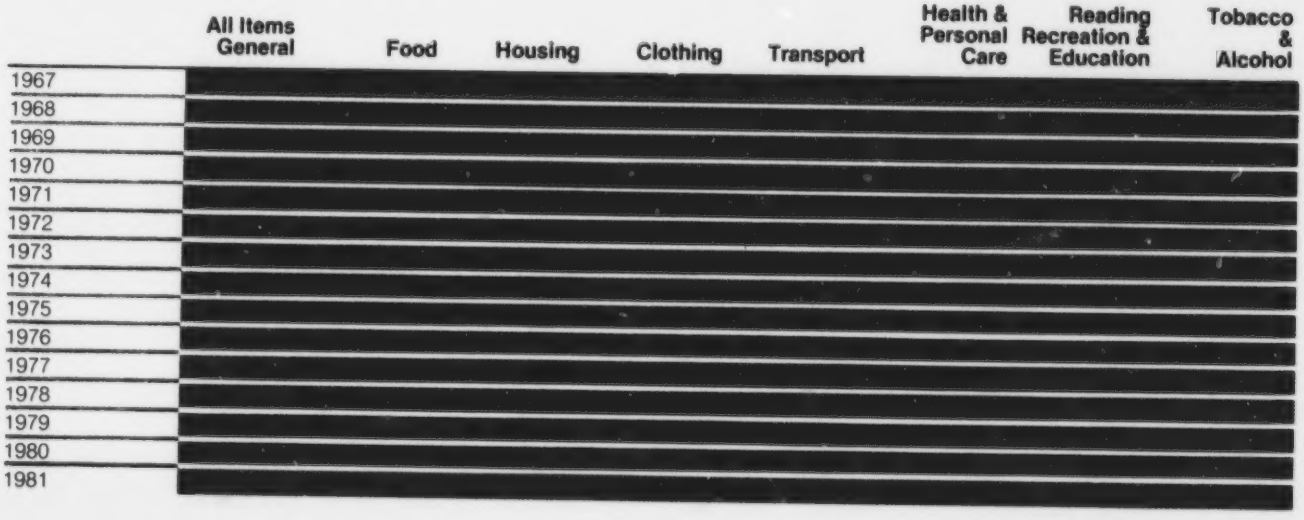


Table 5.12 **Component Group Indexes of the Consumer Price Index - Edmonton and Calgary - 1974-1981** (1971 = 100)

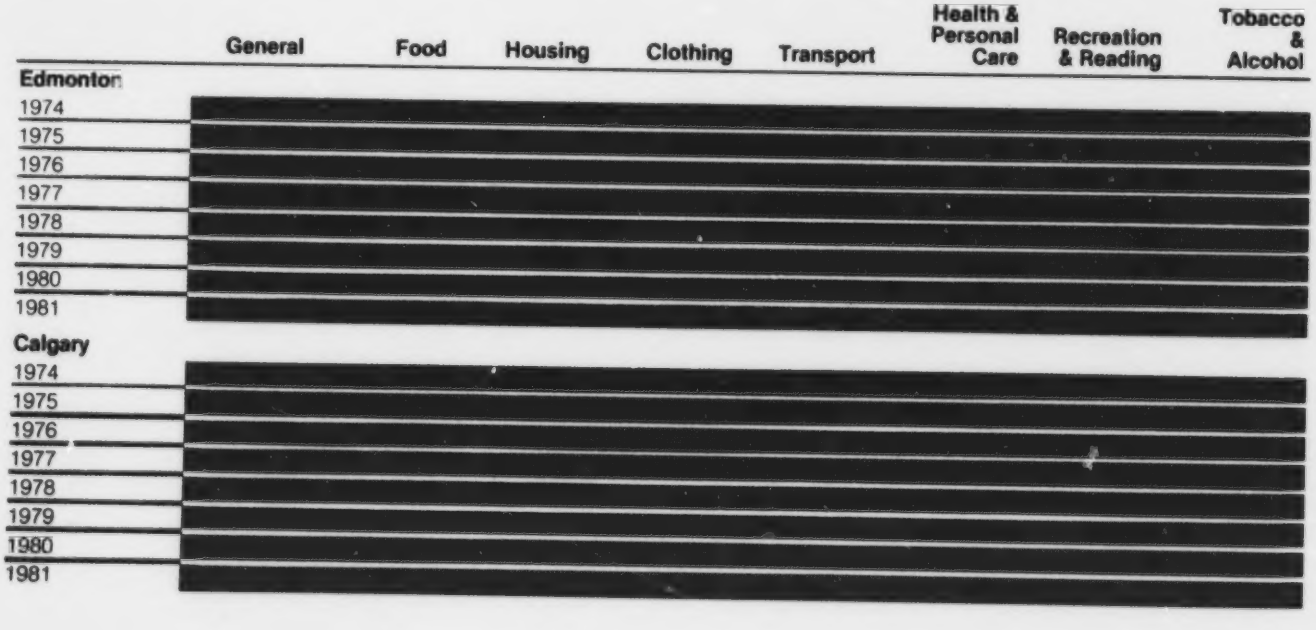


Table 5.13 Consumer Price Index for Regional Cities - Canada - 1949-1981

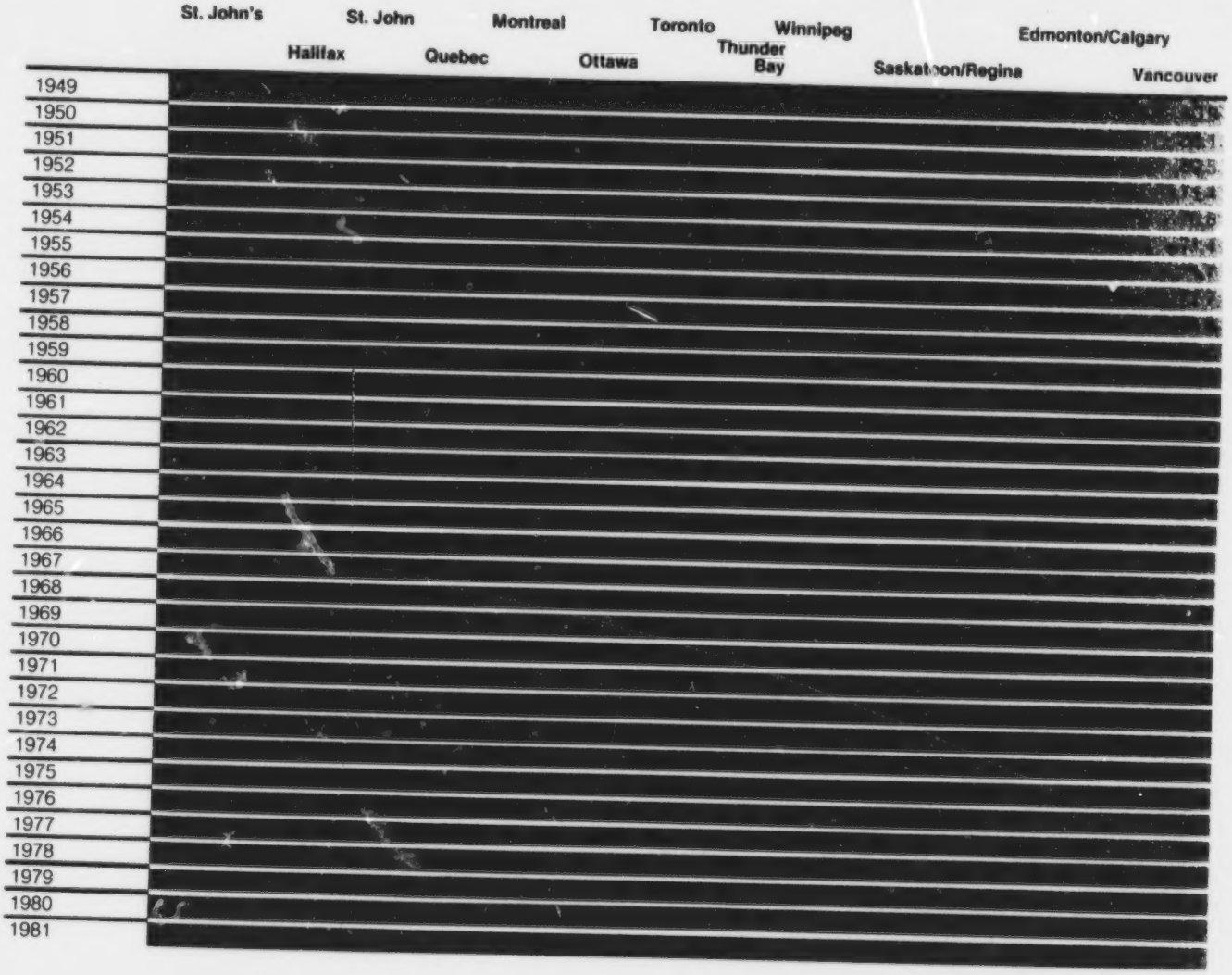
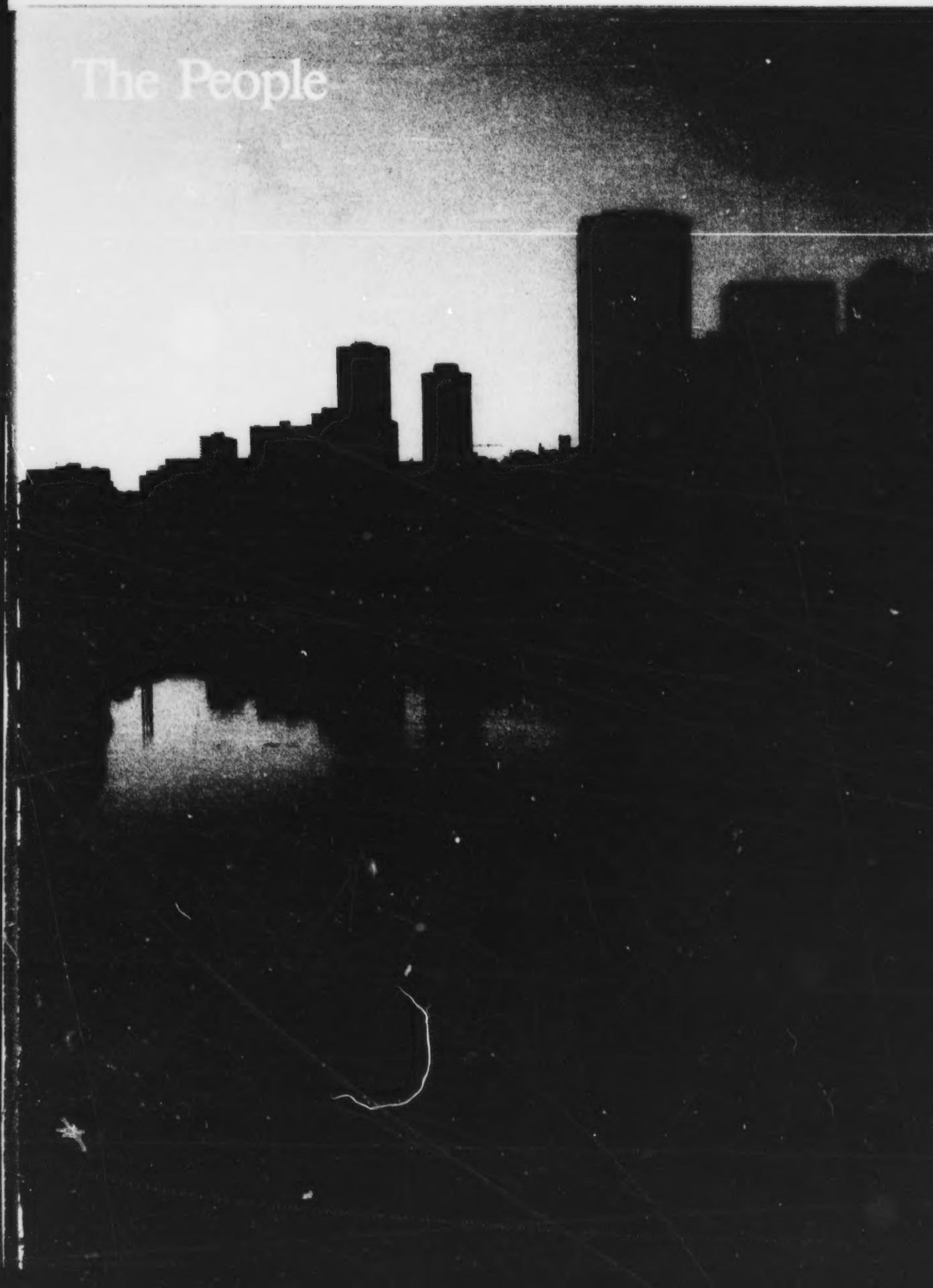
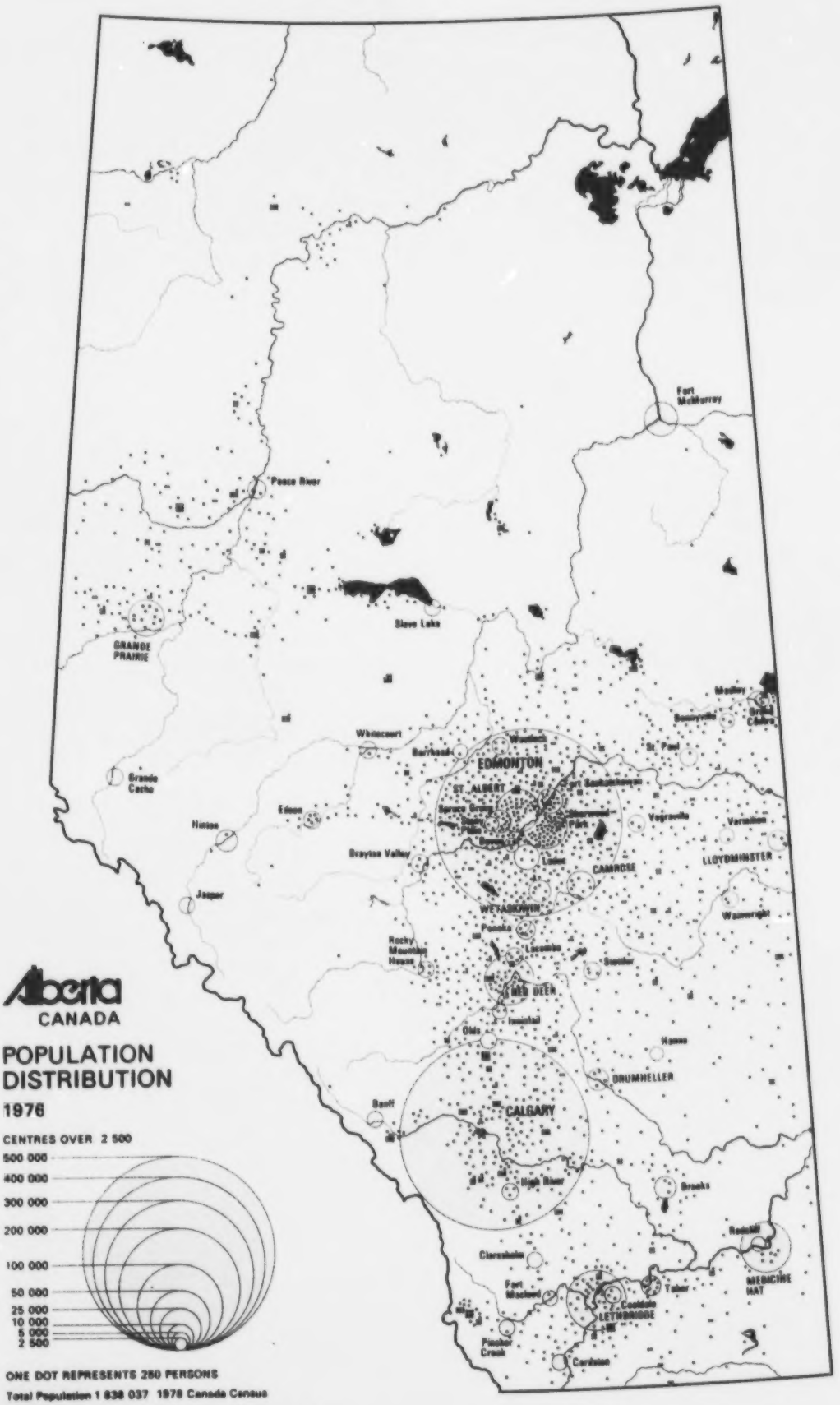


Table 5.14 **Industry Selling Price Indexes by Major Groups, Industries and Selected Commodities -Canada - 1971-1981** (1971 = 100)

Year	Total	Food & Bev. Ind.	Textile Ind.	Wood Ind.	Primary Metal Ind.	Metal Fab. Ind.	Non-Metallic Mineral Prod. Ind.	Chemical & Chemical Prod. Ind.
1971								
1972								
1973								
1974								
1975								
1976								
1977								
1978								
1979								
1980								
1981								

The People




Alberta
CANADA
POPULATION
DISTRIBUTION
1976
CENTRES OVER 2 500
500 000
400 000
300 000
200 000
100 000
50 000
25 000
10 000
5 000
2 500
ONE DOT REPRESENTS 250 PERSONS
Total Population 1 838 037 1976 Canada Census
Produced by the Alberta Bureau of Surveying and Mapping © 1982
Fort McMurray
Peace River
Slave Lake
GRANDE PRAIRIE
Whitecourt
Barrhead
EDMONTON
ST. ALBERT
Grande Cache
Edson
Hinton
Drayton Valley
CAMROSE
LLOYDMINSTER
Jasper
WETASKIWIN
Rocky Mountain House
RED DEER
DRUMHELLER
Banff
CALGARY
Brooks
Claresholm
Fort Macleod
LETHBRIDGE
MEDICINE HAT
Pincher Creek
Cardston

People

Plains Indians were the original inhabitants of the territory which is now Alberta. It is assumed that their ancestors crossed the Bering Strait from Asia in prehistoric times. From carbon-dated remains and artifacts it is known that they reached North America at least 20,000 years ago, subsisting as nomadic hunters and trappers.

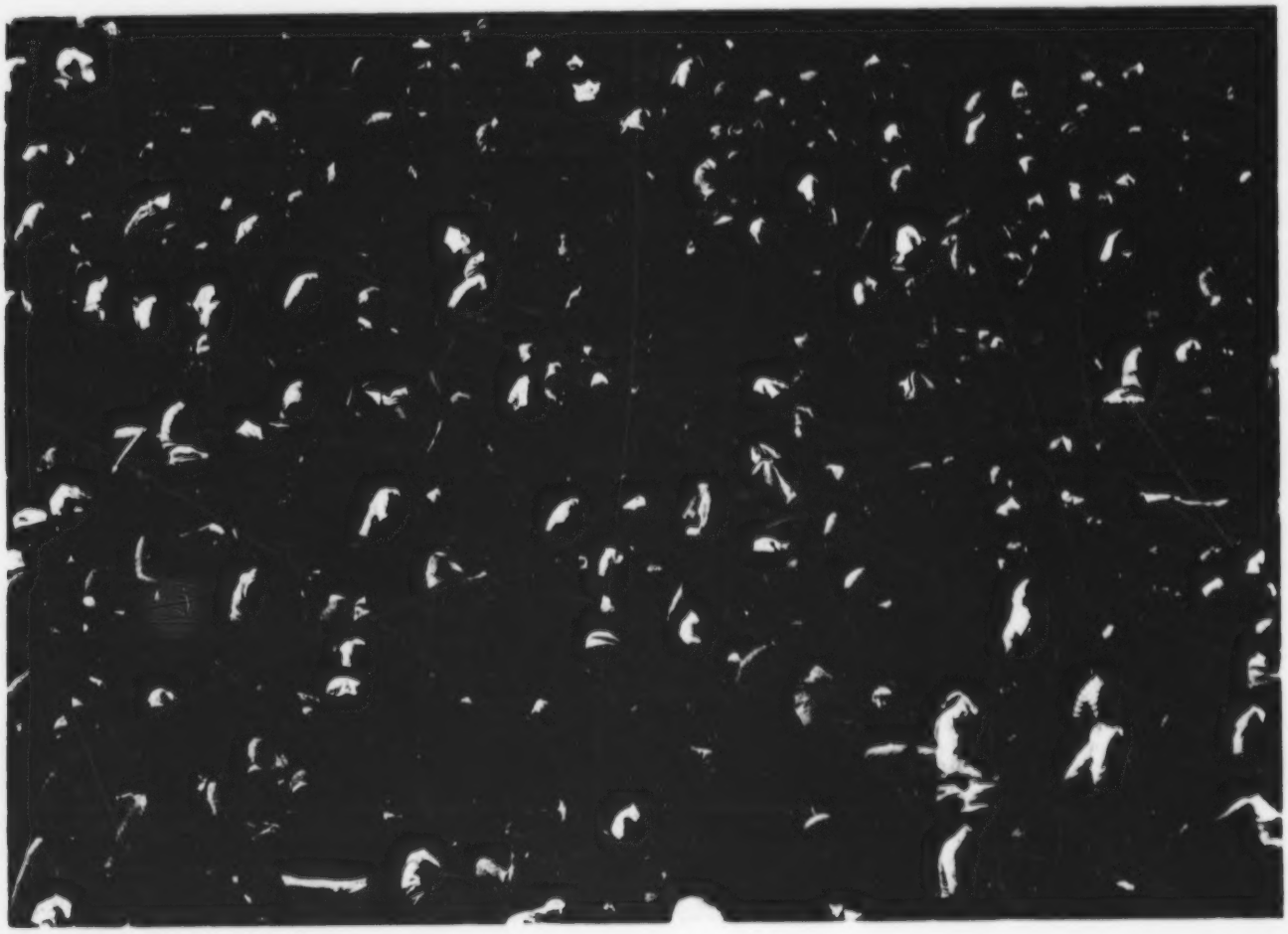
Fur-trading companies were active in Alberta during the 18th and early 19th centuries but it was the aftermath of the American civil war and heavy European immigration in the 19th century which really stimulated development of the area. Concerned that American settlers and government would take over all of North America west of the Great Lakes, the federal government of Canada bought out the land grants of the Hudson's Bay Company, established a police force for the area, and assisted financially in the construction of the transcontinental Canadian Pacific Railway. Completed in 1885, the railway brought in settlers and made both necessary and feasible the production and export of commodities other than furs.

The first major tide of immigrants settled in the province during the 1896 - 1913 period. As a result, population rose from 50,000 to 400,000. A second wave of immigration came during the period 1918 - 1931, increasing population to 730,000. A third influx, beginning after World War II, continues to the present day. Alberta's population is now over 2,300,000.

Official 1981 census data were not available at time of going to press. Latest available information showed that of the current population, approximately 47 per cent are of British descent, 14 per cent German, 12 per cent Slavic (Russian, Ukrainian and Polish), 6 per cent French, and about 3 per cent native Indian. The balance came from a wide range of countries. There are no significant geographic concentrations of ethnic groups, although that of Slavic groups is proportionately heavier to the north and east of Edmonton. By 1976, over 62 per cent of Albertans were native born and an additional 15 per cent were born in western Canada. These proportions may have been modified slightly by the heavy inter-provincial migration of recent years.

English is the language of the vast majority. Most religious faiths are represented, with United, Roman Catholic, Anglican and Lutheran churches comprising three-quarters of the total.

Until the drought and depression of the 1930's, the population distribution in all census divisions in the southern half of the province (below 54 degrees latitude) was remarkably even. This situation was dictated by homesteading opportunities, and the fact that all areas were being tested for suitability for various types of agriculture. Only one-quarter of the population lived in urban communities. Over the next five decades, however, these urban-rural proportions were completely reversed as the industrial-social development of the province proceeded.



Census Data

Alberta's population reached 2,237,724 in 1981, a 21.7 per cent increase since 1976, and almost double that of 25 years earlier. Over the five year intercensal period, population density increased from 2.9 persons to 3.5 persons per square kilometre.

Most of the population increase over the past five years has occurred in urban areas, where an overall growth rate of 24.0 per cent has brought the urban population to 1.7 million persons, 77.2 per cent of the total. Perhaps surprisingly, most of the increase in urban population occurred within small and medium sized urban centres of less than 30,000 persons. At 21 per cent, the intercensal population increase within Edmonton and Calgary combined was marginally lower than that registered province wide.

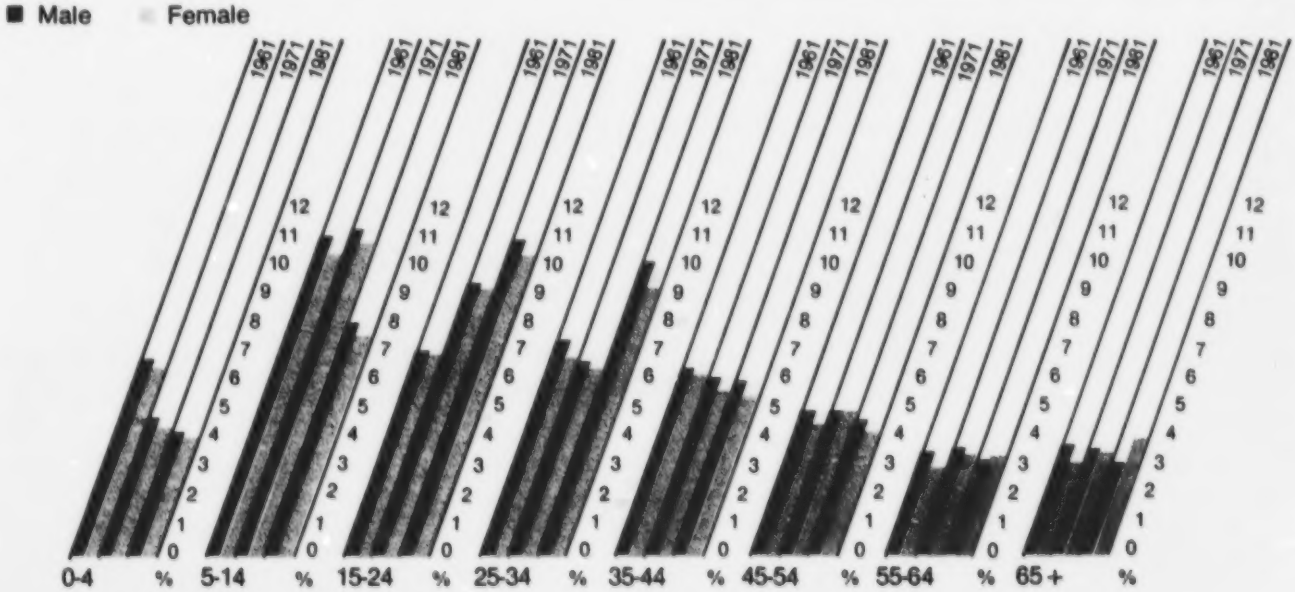
In 1981, 81 per cent of Alberta's residents, or 1.8 million persons, claimed English as their mother tongue. This represents an increase of 22 per cent over the same figure five years earlier. Alberta's second largest language group, German, reached 91 thousand in number, a 14 per cent increase. Largest relative increases during the five year intercensal period were experienced within the mother tongue groups having the smallest absolute number of members: Spanish, Indo-Pakistani, Semitic, and Armenian - with increases ranging up to 200 per cent.

The population has increased annually for all but a very few (those related to movements during the War) of the last fifty years. Birth rates peaked in the mid-1950's and have been declining ever since. The actual numbers of live births peaked in 1960, then declined steadily for more than a decade; in recent years they have been rising again.

Marriage rates were high during the war and immediate post war years, then declined steadily until the early 1960's. In recent years, they have approached war time levels.

Death rates have been declining fractionally but steadily for most of the past fifty years. This is due partly to improved health care, partly to a tendency for older couples to retire in more equable climates, and partly to the heavy influx in recent years of young people from other parts of Canada.

Population by Sex and Specified Age Groups - Alberta - 1961, 1971, 1981



Total Population - 1961	1,331,944
Total Population - 1971	1,627,874
Total Population - 1981	2,237,724

Table 6.1 **Population by Census Divisions - Alberta - 1961, 1971, 1976, 1981**

Census Division	1961 No.	1961 Percent of Total	1971 No.	1971 Percent of Total	1976 No.	1976 Percent of Total	1981 No.	1981 Percent of Total
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
Total	1,331,944	100.0	1,627,874	100.0	1,838,037	100.0	2,237,724	100.0

Table 6.2 **Population - Rural and Urban, Numerical and Percentage Distribution - Alberta - Selected Years - 1901-1981**

Year	Total No.	Rural No.	Percent of Total	Urban No.	Percent of Total
1901					
1911					
1921					
1931					
1941					
1951					
1961					
1966					
1971					
1976					
1981					

Table 6.3 **Population of Cities, Towns and Villages and Percentages of Total Population - Alberta - Selected Years - 1901-1981**

Year	Cities		Towns		Villages	
	No.	%	No.	%	No.	%
1901						
1911						
1921						
1931						
1941						
1951						
1961						
1966						
1971						
1976						
1981						

Table 6.4 **Population of Incorporated Cities, Towns and Villages - Alberta - Selected Years - 1931-1981**

	City (C), Town (T), Village (V), or Summer Village (SV)	Census Division	1931	1941	1951	1961	1971	1976	1981
Acme	V	5							
Airdrie	T	6							
Alberta Beach	SV	13							
Alix	V	8							
Alliance	V	7							
Amisk	V	7							
Andrew	V	10							
Argentia Beach	SV	11							
Arrowwood	V	5							
Athabasca	T	13							
Barnwell	V	2							
Barons	V	2							
Barrhead	T	13							
Bashaw	T	10							
Bassano	T	2							
Bawlf	V	10							
Beaumont	V	11							
Beaverlodge	T	15							
Beiseker	V	6							
Bellevue	V	9							
Bentley	V	8							
Berwyn	V	15							
Betula Beach	SV	11							
Big Valley	V	7							

	City (C), Town (T), Village (V), or Summer Village (SV)	Census Division	1931	1941	1951	1961	1971	1976	1981
Birchcliff	SV	8	■	■	■	■	■	■	■
Bittern Lake	V	10	■	■	■	■	■	■	■
Black Diamond	T	6	■	■	■	■	■	■	■
Blackfalds	V	8	■	■	■	■	■	■	■
Blackie	V	6	■	■	■	■	■	■	■
Blairmore	T	9	■	■	■	■	■	■	■
Bon Accord	V	11	■	■	■	■	■	■	■
Bonnyville	T	12	■	■	■	■	■	■	■
Bonnyville Beach	SV	12	■	■	■	■	■	■	■
Botha	V	7	■	■	■	■	■	■	■
Bowden	V	8	■	■	■	■	■	■	■
Bow Island	T	1	■	■	■	■	■	■	■
Boyle	V	13	■	■	■	■	■	■	■
Breton	V	11	■	■	■	■	■	■	■
Brooks	T	2	■	■	■	■	■	■	■
Bruderheim	V	10	■	■	■	■	■	■	■
Burdett	V	1	■	■	■	■	■	■	■
Calgary	C	6	■	■	■	■	■	■	■
Calmar	T	11	■	■	■	■	■	■	■
Camrose	C	10	■	■	■	■	■	■	■
Canmore	T	9	■	■	■	■	■	■	■
Carbon	V	5	■	■	■	■	■	■	■
Cardston	T	3	■	■	■	■	■	■	■
Carmangay	V	5	■	■	■	■	■	■	■
Caroline	V	8	■	■	■	■	■	■	■
Carstairs	T	6	■	■	■	■	■	■	■
Castle Island	SV	13	■	■	■	■	■	■	■
Castor	T	7	■	■	■	■	■	■	■
Cayley	V	6	■	■	■	■	■	■	■
Cereal	V	4	■	■	■	■	■	■	■
Champion	V	5	■	■	■	■	■	■	■
Chauvin	V	7	■	■	■	■	■	■	■
Chestermere Lake	SV	6	■	■	■	■	■	■	■
Chinook	V	4	■	■	■	■	■	■	■
Chipman	V	10	■	■	■	■	■	■	■
Claresholm	T	3	■	■	■	■	■	■	■
Clive	V	8	■	■	■	■	■	■	■
Cluny	V	5	■	■	■	■	■	■	■
Clyde	V	13	■	■	■	■	■	■	■
Coaldale	T	2	■	■	■	■	■	■	■
Coalhurst	V	2	■	■	■	■	■	■	■
Cochrane	T	6	■	■	■	■	■	■	■
Cold Lake	T	12	■	■	■	■	■	■	■
Coleman	T	9	■	■	■	■	■	■	■
Consort	V	4	■	■	■	■	■	■	■

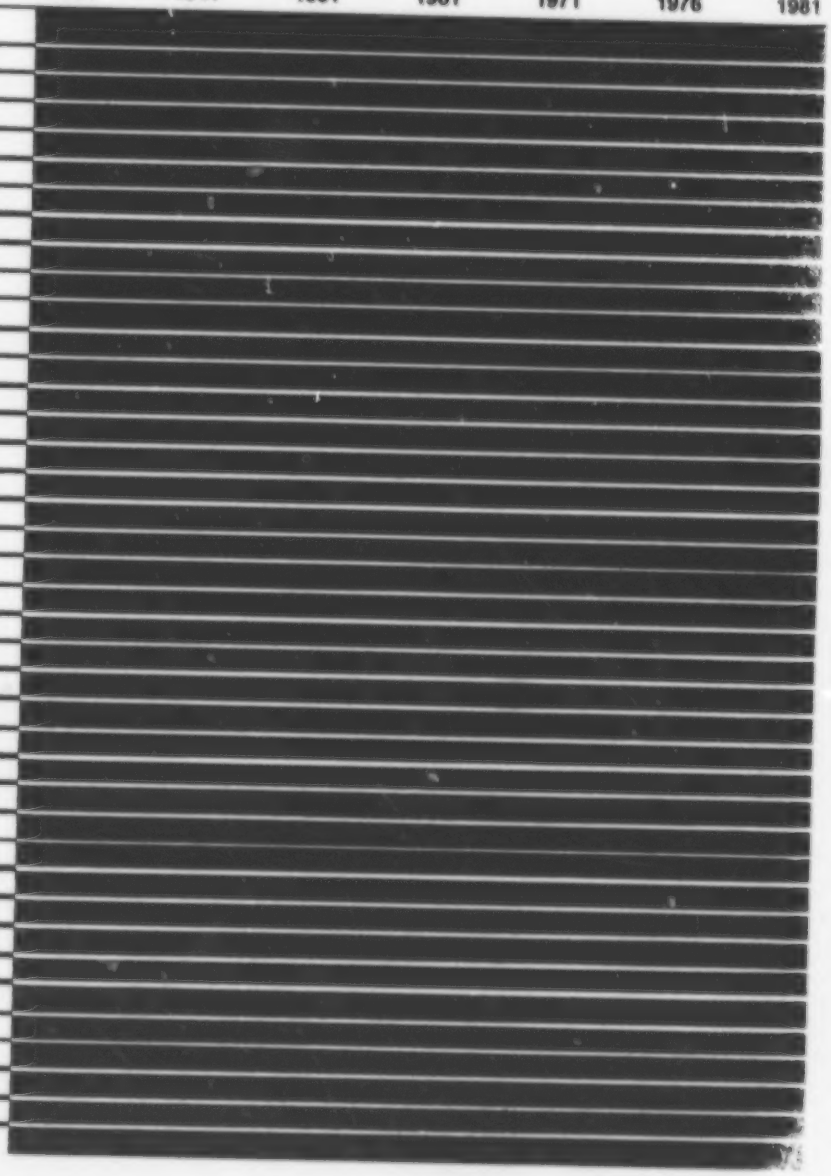
	City (C), Town (T), Village (V), or Summer Village (SV)	Census Division	1931	1941	1951	1961	1971	1976	1981
Coronation	T	7							
Coutts	V	2							
Cowley	V	3							
Cremona	V	6							
Crossfield	V	6							
Crowsnest Pass	T	9							
Crystal Springs	SV	11							
Czar	V	7							
Daysland	T	7							
Delburne	V	8							
Delia	V	5							
Derwent	V	10							
Devon	T	11							
Dewberry	V	10							
Didsbury	T	6							
Donalda	V	7							
Donnelly	V	15							
Drayton Valley	T	11							
Drumheller	C	5							
Duchess	V	2							
Eaglesham	V	15							
Eckville	T	8							
Edberg	V	10							
Edgerton	V	7							
Edmonton	C	11							
Edmonton Beach	SV	11							
Edson	T	14							
Elk Point	T	12							
Elnora	V	8							
Empress	V	4							
Entwistle	V	11							
Evansburg	V	14							
Fairview	T	15							
Falher	T	15							
Ferintosh	V	10							
Foremost	V	1							
Forestburg	V	7							
Fort Assiniboine	V	13							
Fort Macleod	T	3							
Fort McMurray	C	12							
Fort Saskatchewan	T	11							
Fox Creek	T	15							
Frank	V	9							
Gadsby	V	7							
Galahad	V	7							

	City (C), Town (T), Village (V), or Summer Village (SV)	Census Division	1931	1941	1951	1961	1971	1976	1981
Gibbons	T	11							
Girouxville	V	15							
Gleichen	T	5							
Glendon	V	12							
Glenwood	V	3							
Golden Days	SV	11							
Grand Centre	T	12							
Grande Cache	T	15							
Grande Prairie	C	15							
Grandview	SV	11							
Granum	T	3							
Grassy Lake	V	2							
Grimshaw	T	15							
Gull Lake	SV	8							
Hairy Hill	V	10							
Halfmoon Bay	SV	8							
Halkirk	V	7							
Hanna	T	4							
Hardisty	T	7							
Hay Lakes	V	10							
Heisler	V	7							
High Level	T	15							
High Prairie	T	15							
High River	T	6							
Hill Spring	V	3							
Hines Creek	V	15							
Hinton	T	14							
Holden	V	10							
Hughenden	V	7							
Hussar	V	5							
Hythe	V	15							
Innisfail	T	8							
Innisfree	V	10							
Irma	V	7							
Irricana	V	6							
Irvine	T	1							
Island Lake	SV	13							
Itaska Beach	SV	11							
Kapasiwin	SV	11							
Killam	T	7							
Kinuso	V	15							
Kitscoty	V	10							
Lac La Biche	T	12							
Lacombe	T	8							
Lakeview	SV	11							

	City (C), Town (T), Village (V), or Summer Village (SV)	Census Division	1931	1941	1951	1961	1971	1976	1981
Lamont	T	10							
Lavoy	V	10							
Leduc	T	11							
Legal	V	11							
Lethbridge	C	2							
Linden	V	5							
Lloydminster (part)	C	10							
Lomond	V	5							
Longview	V	6							
Lougheed	V	7							
Magrath	T	3							
Ma-Me-O-Beach	SV	11							
Manning	T	15							
Mannville	V	10							
Marwayne	V	10							
Mayerthorpe	T	13							
McLennan	T	15							
Medicine Hat	C	1							
Mewatha Beach	SV	13							
Milk River	T	2							
Millet	V	11							
Milo	V	5							
Minburn	V	10							
Mirror	V	8							
Morinville	T	11							
Morrin	V	5							
Mundare	T	10							
Munson	V	5							
Myrnam	V	10							
Nakamun Park	SV	13							
Nampa	V	15							
Nanton	T	3							
New Norway	V	10							
New Sarepta	V	11							
Nobleford	V	2							
Norglenwold	SV	8							
Okotoks	T	6							
Olds	T	6							
Onoway	V	13							
Oyen	T	4							
Paradise Valley	V	10							
Peace River	T	15							
Pelican Narrows	SV	12							
Penhold	V	8							
Picture Butte	T	2							

	City (C), Town (T), Village (V), or Summer Village (SV)	Census Division	1931	1941	1951	1961	1971	1976	1981
Pincher Creek	T	3	■	■	■	■	■	■	■
Plamondon	V	12	■	■	■	■	■	■	■
Point Allison	SV	11	■	■	■	■	■	■	■
Poplar Bay	SV	11	■	■	■	■	■	■	■
Ponoka	T	8	■	■	■	■	■	■	■
Provost	T	7	■	■	■	■	■	■	■
Radway	V	13	■	■	■	■	■	■	■
Rainbow Lake	T	15	■	■	■	■	■	■	■
Raymond	T	2	■	■	■	■	■	■	■
Redcliff	T	1	■	■	■	■	■	■	■
Red Deer	C	8	■	■	■	■	■	■	■
Redwater	T	13	■	■	■	■	■	■	■
Rimbey	T	8	■	■	■	■	■	■	■
Rochon Sands	SV	7	■	■	■	■	■	■	■
Rockyford	V	5	■	■	■	■	■	■	■
Rocky Mountain House	T	8	■	■	■	■	■	■	■
Rosalind	V	10	■	■	■	■	■	■	■
Rosemary	V	2	■	■	■	■	■	■	■
Ross Haven	SV	13	■	■	■	■	■	■	■
Rumsey	V	5	■	■	■	■	■	■	■
Rycroft	V	15	■	■	■	■	■	■	■
Ryley	V	10	■	■	■	■	■	■	■
St. Albert	C	11	■	■	■	■	■	■	■
St. Paul	T	12	■	■	■	■	■	■	■
Sandy Beach	SV	13	■	■	■	■	■	■	■
Sangudo	V	13	■	■	■	■	■	■	■
Seba Beach	SV	11	■	■	■	■	■	■	■
Sedgewick	T	7	■	■	■	■	■	■	■
Sexsmith	V	15	■	■	■	■	■	■	■
Silver Beach	SV	11	■	■	■	■	■	■	■
Silver Sands	SV	13	■	■	■	■	■	■	■
Slave Lake	T	15	■	■	■	■	■	■	■
Smoky Lake	T	12	■	■	■	■	■	■	■
South View	SV	13	■	■	■	■	■	■	■
Spirit River	T	15	■	■	■	■	■	■	■
Spruce Grove	T	11	■	■	■	■	■	■	■
Standard	V	5	■	■	■	■	■	■	■
Stavely	T	3	■	■	■	■	■	■	■
Stettler	T	7	■	■	■	■	■	■	■
Stirling	V	2	■	■	■	■	■	■	■
Stony Plain	T	11	■	■	■	■	■	■	■
Strathmore	T	5	■	■	■	■	■	■	■
Strome	V	7	■	■	■	■	■	■	■
Sundance Beach	SV	11	■	■	■	■	■	■	■
Sundre	T	6	■	■	■	■	■	■	■

	City (C), Town (T), Village (V), or Summer Village (SV)	Census Division
Sunset Beach	SV	13
Sunset Point	SV	13
Swan Hills	T	15
Sylvan Lake	T	8
Taber	T	2
Thorhild	V	13
Thorsby	V	11
Three Hills	T	5
Tilley	V	2
Tofield	T	10
Torrington	V	5
Trochu	T	5
Turner Valley	V	6
Two Hills	T	10
Val Quentin	SV	13
Valleyview	T	15
Vauxhall	T	2
Vegreville	T	10
Vermilion	T	10
Veteran	V	4
Viking	T	10
Vilna	V	12
Vulcan	T	5
Wabamum	V	11
Wainwright	T	7
Wanham	V	15
Warburg	V	11
Warner	V	2
Warspite	V	12
Waskatenau	V	12
Wembley	V	15
West Cove	SV	13
Westlock	T	13
Wetaskiwin	C	11
Whitecourt	T	14
Whitesands	SV	7
Wildwood	V	14
Willingdon	V	10
Yellowstone	SV	13
Youngstown	V	4



Note: Effective January 1, 1979, Bellevue, Blairmore, Coleman and Frank were amalgamated into the new municipality of Crowsnest Pass.

Table 6.5 Population for Census Divisions, Urban Size Groups and Rural Alberta - 1981

		Urban						Rural
	Total	Total	500,000 and Over	30,000 to 99,999	10,000 to 29,999	5,000 to 9,999	2,500 to 4,999	1,000 to 2,499	Total
	2,237,724	1,727,545	1,188,300	175,723	80,677	104,401	119,376	59,068	510,179
CD 1									
CD 2									
CD 3									
CD 4									
CD 5									
CD 6									
CD 7									
CD 8									
CD 9									
CD 10									
CD 11									
CD 12									
CD 13									
CD 14									
CD 15									

Table 6.6 Population by Mother Tongue, by Census Divisions and Cities over 10,000 - Alberta - 1981

	Total	English	French	German	Indian & Eskimo	Italian	Netherlands & Flemish	Polish	Ukrainian	Other*
CD 1										
CD 2										
CD 3										
CD 4										
CD 5										
CD 6										
CD 7										
CD 8										
CD 9										
CD 10										
CD 11										
CD 12										
CD 13										
CD 14										
CD 15										
Alberta	2,237,725	1,810,545	62,145	91,480	27,560	16,180	21,990	13,065	68,130	126,630
Calgary										
Edmonton										
Grande Prairie										
Lethbridge										
Medicine Hat										
Red Deer										
St. Albert										

*Includes Not Stated

Table 6.7 Population by Religious Denomination for Census Divisions - Alberta - 1971

Census Division	Total	Adventist	Anglican	Baptist	Buddhist and Confucian	Christian and Missionary Alliance	Christian Reformed	Churches of Christ Disciples	Greek Orthodox	Hutterite	Jehovah's Witnesses
CD 1											
CD 2											
CD 3											
CD 4											
CD 5											
CD 6											
CD 7											
CD 8											
CD 9											
CD 10											
CD 11											
CD 12											
CD 13											
CD 14											
CD 15											
Alberta	1,627,875	5,210	170,230	49,710	2,410	5,520	13,425	2,400	47,165	6,100	17,930

	Jewish	Lutheran	Mennonite	Mormon	Pente-costal	Presby-terian	Roman Catholic	Salvation Army	Ukrainian Catholic	United Church	Other	No Religion
CD 1												
CD 2												
CD 3												
CD 4												
CD 5												
CD 6												
CD 7												
CD 8												
CD 9												
CD 10												
CD 11												
CD 12												
CD 13												
CD 14												
CD 15												
Alberta	6,260	133,050	14,645	31,085	23,100	57,180	391,390	4,645	41,070	456,930	40,010	108,410

Table 6.8 **Population by Ethnic Group for Census Divisions - Alberta - 1971**

	British Isles	French	Austrian	Chinese	Czech	Finnish	German	Hungarian	Italian	Japanese	Jewish
CD 1											
CD 2											
CD 3											
CD 4											
CD 5											
CD 6											
CD 7											
CD 8											
CD 9											
CD 10											
CD 11											
CD 12											
CD 13											
CD 14											
CD 15											
Alberta	761,665	94,665	6,305	12,905	10,320	3,595	231,005	16,245	24,805	4,460	7,320

	Native Indian	Negro	Nether-lands	Polish	Russian	Scandi-navian	Slovak	Ukrai-nian	West Indian	Other & Unknown	Total
CD 1											
CD 2											
CD 3											
CD 4											
CD 5											
CD 6											
CD 7											
CD 8											
CD 9											
CD 10											
CD 11											
CD 12											
CD 13											
CD 14											
CD 15											
Alberta	44,545	1,395	58,570	44,325	10,235	98,425	2,650	135,510	855	58,070	1,627,875

Table 6.9 Population 15 Years and Over, by School Attendance, Showing Level of Schooling -Alberta - 1976

	In Full Time Attendance					
	At Elementary or Secondary School	At Post-Secondary Non-University Institution	At University	Total	Not in Full Time Attendance	Total
Population 15 Years and Over						
Elementary & Secondary Only						
Less than Grade 5						
Grades 5-8						
Grades 9-10						
Grades 11-13						
Without Secondary School Certificate						
With Secondary School Certificate						
Post-Secondary Non-University Only						
Without Certificate or Diploma						
With Certificate or Diploma						
University Only						
Without Certificate, Diploma or Degree						
With Certificate, Diploma or Degree						
Degree						
Bachelor						
Medical						
Master's						
Doctorate						
University and Post-Secondary Non-University						
Without Post-Secondary Certificate Diploma or Degree						
With Non-University Certificate or Diploma						
With University Certificate or Diploma						
Degree						
Bachelor						
Medical						
Master's						
Doctorate						

Table 6.10 Population by Specified Age Groups in Census Divisions - Alberta - 1981

	Age Groups											
	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65-69	70 +	Total
CD 1												
CD 2												
CD 3												
CD 4												
CD 5												
CD 6												
CD 7												
CD 8												
CD 9												
CD 10												
CD 11												
CD 12												
CD 13												
CD 14												
CD 15												
Total Alberta	187,960	174,150	179,565	214,425	264,330	435,540	259,315	203,740	155,300	57,410	105,980	2,237,715

Table 6.11 Families by Number of Persons for Census Divisions and Municipalities of 5,000 Population and Over - Alberta - 1981

	Families by Number of Persons							Families		
	2	3	4	5	6	7	8 +	Number	No. of Persons in:	Average No. of Persons in:
CD 1										
CD 2										
CD 3										
CD 4										
CD 5										
CD 6										
CD 7										
CD 8										
CD 9										
CD 10										
CD 11										
CD 12										
CD 13										
CD 14										
CD 15										
Total Alberta	215,505	121,415	138,445	62,005	20,020	5,115	3,125	565,635	1,842,435	3.3

	Families by Number of Persons							Families		
	2	3	4	5	6	7	8+	Number	No. of Persons in:	Average No. of Persons in:
Airdrie										
Brooks										
Calgary										
Camrose										
Crowsnest Pass										
Drayton Valley										
Drumheller										
Edmonton										
Edson										
Fort McMurray										
Fort Saskatchewan										
Grande Prairie										
Hinton										
Innisfail										
Lacombe										
Leduc										
Lethbridge										
Lloydminster (Alta. Portion)										
Medicine Hat										
Peace River										
Ponoka										
Red Deer										
Spruce Grove										
St. Albert										
Stettler										
Taber										
Vegreville										
Wetaskiwin										
Whitecourt										

Table 6.12 Families by Family Structure, for Census Divisions - Alberta - 1981

	Total Families	Husband-Wife Families	Lone Parent Families			Total Families		
			Total	Male Parent	Female Parent	With Children at Home	With All Children At Home 18 Years and Over	With All Children at Home 17 Years and Under
CD 1								
CD 2								
CD 3								
CD 4								
CD 5								
CD 6								
CD 7								
CD 8								
CD 9								
CD 10								
CD 11								
CD 12								
CD 13								
CD 14								
CD 15								
Alberta	585,635	508,705	56,905	10,230	46,685	379,995	53,645	277,130

Table 6.13 Private Households by Number of Persons for Census Divisions and Municipalities of 5,000 Population and Over - Alberta - 1981

	Households by Number of Persons						Households		
	1	2	3	4	5	6+	Number	No. of Persons in	Average No. of Persons in
CD 1									
CD 2									
CD 3									
CD 4									
CD 5									
CD 6									
CD 7									
CD 8									
CD 9									
CD 10									
CD 11									
CD 12									
CD 13									
CD 14									
CD 15									
Total Alberta	147,390	225,635	133,240	143,296	69,450	39,235	58,240	2,179,350	2.9

	Households by Number of Persons						Households		
	1	2	3	4	5	6+	Number	No. of Persons in	Average No. of Persons in
Airdrie									
Brooks									
Calgary									
Camrose									
Crowsnest Pass									
Drayton Valley									
Drumheller									
Edmonton									
Edson									
Fort McMurray									
Fort Saskatchewan									
Grande Prairie									
Hinton									
Innisfail									
Lacombe									
Leduc									
Lethbridge									
Lloydminster (Alberta Portion)									
Medicine Hat									
Peace River									
Ponoka									
Red Deer									
Spruce Grove									
St. Albert									
Stettler									
Taber									
Vegreville									
Wetaskiwin									
Whitecourt									

Table 6.14 Occupied Private Dwellings by Tenure, Showing Structural Type, for Census Divisions -Alberta - 1976

	Tenure	Total Occupied Private Dwellings	Structural Type								
				Single Attached						Movable	
			Single Detached	Total Single Attached	Double House	Row House	Attached to a Non-Residential Structure	Apartment	Duplex	Total Movable Dwellings	Mobiles
CD 1	Owned										
	Rented										
CD 2	Owned										
	Rented										
CD 3	Owned										
	Rented										
CD 4	Owned										
	Rented										
CD 5	Owned										
	Rented										
CD 6	Owned										
	Rented										
CD 7	Owned										
	Rented										
CD 8	Owned										
	Rented										
CD 9	Owned										
	Rented										
CD 10	Owned										
	Rented										
CD 11	Owned										
	Rented										
CD 12	Owned										
	Rented										
CD 13	Owned										
	Rented										
CD 14	Owned										
	Rented										
CD 15	Owned										
	Rented										
Alberta		575,280	372,420	43,660	18,465	22,995	2,200	108,195	22,765	28,250	27,365
	Owned	372,820	321,350	12,435	6,000	5,160	1,275	6,300	7,600	25,130	24,425
	Rented	202,455	61,065	31,220	12,465	17,830	925	101,895	15,160	3,115	2,930

Table 6.15 Population by Birthplace by Census Divisions - Alberta - 1971

	Total Population	Canada		United States	United Kingdom	Germany	Nether-lands	Poland	U.S.S.R.	Other*	Asia
		Alberta	Other Provinces								
CD 1											
CD 2											
CD 3											
CD 4											
CD 5											
CD 6											
CD 7											
CD 8											
CD 9											
CD 10											
CD 11											
CD 12											
CD 13											
CD 14											
CD 15											
Alberta	**1,627,875**	**1,003,095**	**342,520**	**47,510**	**69,350**	**26,385**	**18,045**	**19,475**	**13,965**	**73,935**	**13,595**

*This group is largely other European.

Table 6.16 Population 5 Years and Over Showing Mobility Status 1976, for Census Division of Residence - 1971 (based on sample data)

Census Division Of Residence in 1971	Population 5 Years and Over	Non-Movers	Movers						
			Total	Within Same Province					To a Different Province
				Total	Within Same Census Division		To a Different Census Division Within Alberta		
					Within Same Municipality	To a Different Municipality			
CD 1									
CD 2									
CD 3									
CD 4									
CD 5									
CD 6									
CD 7									
CD 8									
CD 9									
CD 10									
CD 11									
CD 12									
CD 13									
CD 14									
CD 15									
Alberta	**1,537,680**	**748,975**	**788,705**	**676,645**	**425,795**	**97,590**	**153,255**		**112,060**

Table 6.17 Components of International and Interprovincial Migration - Alberta - 1969/70 to 1980/81

Year	International Migration			Interprovincial Migration			Total Net Migration
	Immigration	Emigration	Net	In	Out	Net	
1969/70							
1970/71							
1971/72							
1972/73							
1973/74							
1974/75							
1975/76							
1976/77							
1977/78							
1978/79							
1979/80							
1980/81							

Table 6.18 Migration of Persons Between Alberta and Other Provinces - Specified Periods - 1961-1981

From Alberta To Years	Newfound-land	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatche-wan	British Columbia	Yukon & N.W.T.	Total
1961-66											
1966-71											
1971-76											
1971-72											
1972-73											
1973-74											
1974-75											
1975-76											
1976-77											
1977-78											
1978-79											
1979-80											
1980-81											

To Alberta From Years											
1961-66											
1966-71											
1971-76											
1971-72											
1972-73											
1973-74											
1974-75											
1975-76											
1976-77											
1977-78											
1978-79											
1979-80											
1980-81											

Table 6.19 Population, Births, Marriages, Deaths, and Rates - Alberta - 1937-1981

Year	Population	Births*	Birth Rate Per 1,000 Population	No. of Marriages	Marriage Rate Per 1,000 Population	No. of Deaths*	Death Rate Per 1,000 Population	Rate of Natural Increase Per 1,000 Population
1937								
1938								
1939								
1940								
1941								
1942								
1943								
1944								
1945								
1946								
1947								
1948								
1949								
1950								
1951								
1952								
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1971								
1972								
1973								
1974								
1975								
1976								
1977								
1978								
1979								
1980								
1981								

*Exclusive of stillbirths.

Census Data Definitions

A comprehensive census of Canada and the provinces is taken during the first year of each decade; one much less complete during the sixth year. For practical purposes, it is assumed that socio-economic patterns change so slowly that more frequent censuses cannot be justified.

1. Census divisions are arbitrary but convenient groupings of municipalities. An effort has been made to include municipalities of similar general characteristics in each division.
2. Rural areas include all territory lying outside urban areas. All municipal corporations of less than 1,000 population or of a population density of less than 400 per square kilometre are rural. Corporations are reclassified to urban when they no longer meet the above criteria; they revert to rural when they do.
3. For census purposes, there are no specified criteria for city, town, or village status: some villages may have greater populations than some towns; some towns may be larger than some cities; some hamlets larger than a city, town or village, may be classified rural. Thus, care must be exercised in interpreting the figures.
4. Rural figures are segregated into farm and non-farm in certain tables. Rural farm population includes all persons living in rural areas who are members of the households of farm operators living on their farms for any length of time during the twelve month period prior to the census.

   Rural non-farm population includes all persons living in rural areas who are not members of the households of farm operators living on their farms for any length of time during the twelve month period prior to the census.
5. Family includes all persons who live in the same dwelling and are related by blood, marriage or adoption.
6. Household includes a person, or group of persons not necessarily united by blood ties living together, in one dwelling unit. For census purposes, every person is a member of one and only one household.
7. Mother tongue refers to the first language learned in childhood and still understood by an individual.
8. Ethnic origin refers to the racial origin of the male parent. This may become somewhat blurred as a result of boundary changes in country of origin.
9. Country of origin may become somewhat blurred as a result of boundary changes — sometimes several times.
10. Census metropolitan areas refer to the main labour market areas of urbanized cores having 100,000 or more population. They comprise whole municipalities. Since census metropolitan areas are created by Statistics Canada, they may differ from metropolitan areas designated by local authorities.
11. Urban areas have population concentrations of 1,000 or more, and population densities of 400 or more per square kilometre.
12. Labour force population consists of those persons 15 years of age and over who were employed or unemployed. In a general sense, "employed" is self-explanatory; "unemployed" indicates looking for and available to start work.
13. Participation rate refers to the percentage the total labour force (employed plus unemployed) forms of the population 15 years of age and over in the area or category.

Government

Canada's ten provinces and two territories are linked together by a federal system of government. Under this system, the central and provincial governments each have defined areas of jurisdiction. There are also municipal governments which have responsibility for the provision of many local services within their boundaries.

The division of legislative responsibilities between federal and provincial jurisdictions is set out in the Constitution Act, 1867 (formerly the British North America Act) and subsequent amendments. In 1982, the Constitution was patriated from the United Kingdom. The Constitution Act, 1982, provides an amending formula for constitutional change and also contains a Charter of Rights and Freedoms.

Section 91 of the Constitution Act, 1867, lists 29 areas, such as defence and external relations, which fall under exclusive federal jurisdiction. There is also a clause which provides for federal responsibility in all areas not specifically detailed in other sections of the act.

In Section 92 of the Constitution Act, 1867, 16 provincial responsibilities, such as health, property, and civil rights within provincial borders, are listed. Section 93 gives the provinces control over education. Section 109 provides that lands, mines, minerals and royalties therefrom belong to provinces. In Section 95, agriculture and immigration are identified as joint federal and provincial responsibilities with the federal government having paramountcy in the event of a conflict of legislation.

Under the provisions of the Constitution Act, 1867, provincial governments are given responsibility to legislate with respect to "municipal institutions in the province". Accordingly, the duties and functions that municipal governments perform are established by provincial statute. In Alberta municipal government structures are set out in the Municipal Government Act which provides for different forms of local self-government based upon local conditions and population.

While municipal government councils are elected they do not operate on a parliamentary model as do the federal and provincial governments. The elected municipal officials (aldermen and a mayor) serve both legislative and executive functions. The civic administration is, therefore, responsible to the entire council for its actions. This serves to involve the elected officials in the process of policy formulation and implementation.

Municipal governments have responsibility for the provision of many local services in Alberta. They provide the protection services of police, fire protection, public health and sanitation; the physical services of roads, streets and bridges; public utilities such as light, water, and power; and social services, transportation, and recreational facilities. Local governments also play an important role in planning and designating areas within their boundaries for commercial activities, industrial development, and housing. Local school boards are elected to administer primary and secondary schools within the municipal area.

The Alberta government, like the federal government in Ottawa, has inherited the traditions and practices of British parliamentary democracy. The Legislative Assembly is the body which makes Alberta's laws. This body and an appointed representative of the Sovereign, the Lieutenant-Governor, make up the legislature. The 79 members of the legislative assembly (MLA's) each represent separate constituencies and most belong to political parties. The party which elects the largest number of representatives forms the government, and the next largest party forms the official opposition. If there are other parties with representatives, they too are part of the opposition. When no party has a majority, either a coalition government, with representatives from more than one party, or a minority government, may be formed. Neither a coalition nor minority government has been formed thus far in Alberta's history. Elections must be held at least every five years. They are called after dissolution of the legislature by the Lieutenant-Governor upon the recommendation of the Premier. They also take place if the governing party loses the confidence of the legislature through a defeat on a major vote. These election requirements provide the ultimate assurance of democracy in Alberta.

The executive branch of the Alberta government is made up of the Lieutenant-Governor in Council, a body composed of the Lieutenant-Governor, the Premier, and the Cabinet.

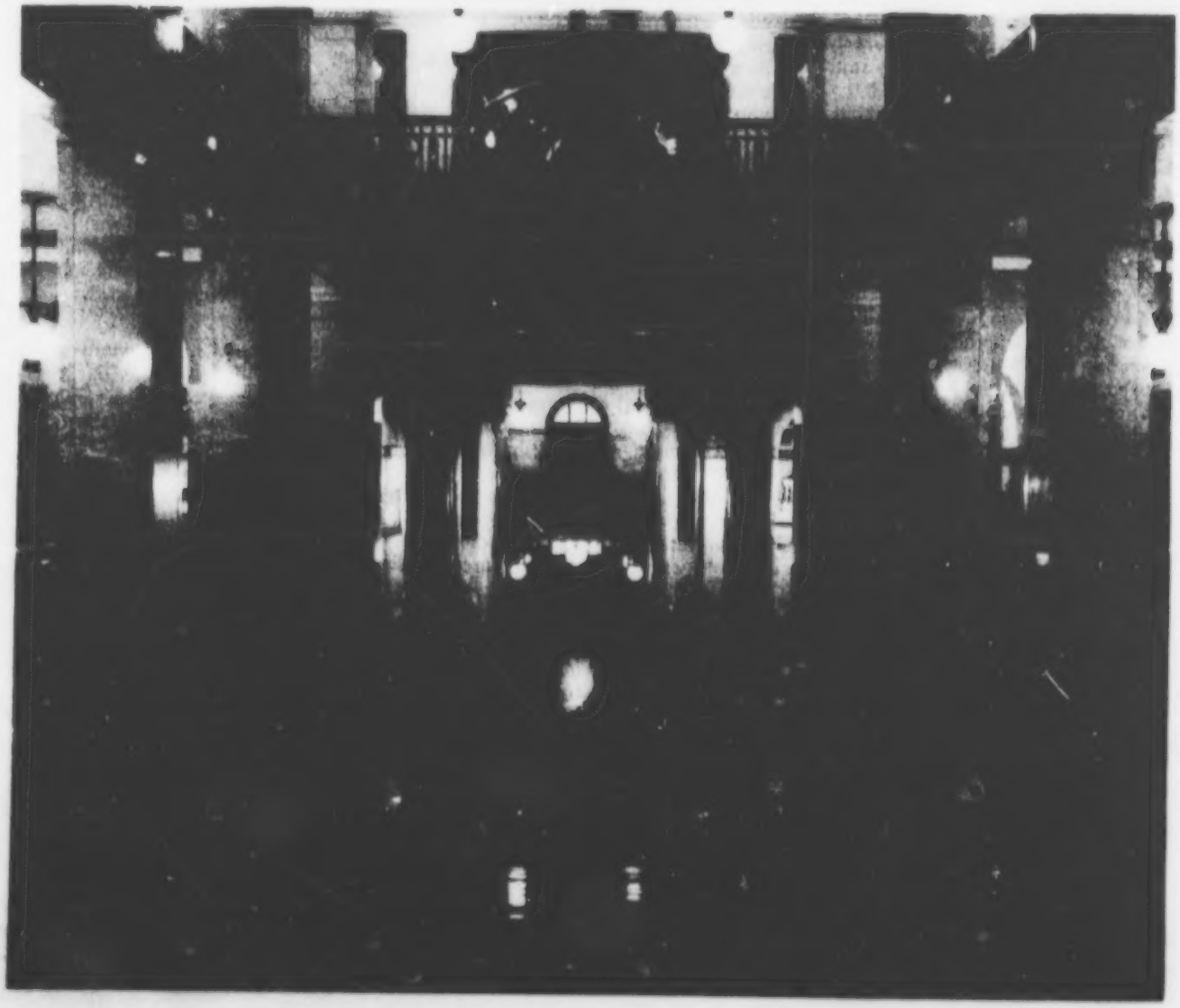
As the Sovereign's representative, the Lieutenant-Governor must give assent to all laws passed by the legislature and regulations passed by the cabinet, although this Royal Assent has rarely been refused. Because the Lieutenant-Governor is not elected, he does not have authority comparable to that of the elected representatives. The office contributes to stability and continuity since the tenure of each Lieutenant-Governor usually bridges successive governments' terms.

The primary executive function of government is filled by the Premier, who is the leader of the largest party in the Legislature, and Cabinet, all of whom are elected members of the legislature. Cabinet ministers receive their appointments from the Lieutenant-Governor upon the advice of the Premier. The Premier is chairman of the Executive Council or Cabinet. Through laws passed in the legislature, authority for many day-to-day decisions of government is

delegated to the Cabinet. Cabinet ministers are responsible to the legislature for the activities of government departments. They also have a major role in recommending legislation to the legislature.

Over the years, Alberta's governments have been conscious of their accountability to the public and of the public's rights in dealing with government. Alberta was the first Canadian province to establish the office of ombudsman. The ombudsman is empowered to review situations and recommend remedial action in cases where members of the public may have been improperly affected by government decisions. The ombudsman is independent of other government officials and reports directly to the legislature.

Alberta was also the first province to allow regular televising of debates in the legislature. A Hansard (written record of debates) is also published.



The Environment

Industrial development in Alberta proceeds within a context of environmental maintenance. Without such protection, accelerated industrial growth could have serious effects on air, water, land and human resources. Recognizing the need to manage the environment, the government organized the Department of the Environment in 1971 and established a legislative framework to create and maintain a balance between environmental protection, industrial development and the quality of life.

The onus for proper and responsible usage of the natural environment is placed directly upon the user. Prevention of pollution is paramount. The cost of environmental protection is considered a normal operational business cost; the government does not provide subsidies.

Alberta Environment receives and channels development applications throughout government, where they must meet departmental criteria. The proponent of new development works closely with the department, submitting designs and plans which reflect environmental protection compliance. When the plans are in accordance with quality standards, a permit for construction is issued. This is separate from a "licence to operate", which is granted only upon completion of construction and after proven adherence to environmental protection criteria.

Industry is required to monitor its own operations, submitting regular reports to the department. These reports, in turn, are verified through a spot-checking system. Where land will be disturbed, a reclamation deposit is required to ensure that effective restoration measures are taken. Should an industrial plant fail to meet the agreed upon environmental standards, the department can issue a control order which formally outlines the corrective action to be taken within a specified time. If the control order is not complied with, the Minister of the Environment can issue a stop order shutting down the operation. Fines can also be levied.

A development proponent can be requested to submit an environmental impact assessment (EIA). This assessment identifies preventive measures necessary to protect a sensitive environment. Public involvement is required as part of the EIA; thus the developer is encouraged to work with the community for mutual benefits.

The government has also taken some innovative measures to encourage environmental awareness. For instance, Alberta initiated legislation for beverage container returns.

Aware of the gap in technology and environmental programming, the Department has adopted an active research program. The Research Management Division develops programs to provide relevant scientific information which meets the Department's needs. The new Alberta Environmental Centre in Vegreville is a unique facility, conducting all environmental research and providing scientific support services to a number of government departments. Interprovincial projects are also anticipated.

Water resources of the province are managed by the Department.

Services range from flood-forecasting to the maintenance of dams and waterways. Licences are required for the diversion or industrial, agricultural and recreational use of water.

Heritage Trust Fund allotments support extensive land reclamation projects. While present day development must include provision for land reclamation as a matter of course, abandoned industrial sites are also being restored. An idea of the range of Alberta Environment's responsibilities can be ascertained by a listing of Acts it administers. These include: The Clean Air Act, The Clean Water Act, The Alberta Environmental Research Trust Act, The Groundwater Control Act, The Water Resources Act, The Beverage Container Act, The Agricultural Chemicals Act, The Litter Act, The Land Surface Conservation and Reclamation Act, The Drainage Districts Act, The Hazardous Chemicals Act, and the Department of the Environment Act.

Manpower

In 1981, as in recent years, Alberta's economic performance continued to lead that of the other regions of Canada. This performance, based on resource development and processing, has been especially marked in the 1970's. The rapid expansion of the economy resulted in significant employment growth. Over the past decade, total employment increased at an average annual rate of 5.4 per cent, double the Canadian rate. While the labour force did increase as a result of an increased number of young people reaching working age, and of higher participation rates, a large proportion of the growth has been due to in-migration. During the 1976-80 period net in-migration was 185 thousand persons: net in-migration from 1969-75 was less than 90 thousand.

Alberta's total employed labour force grew by 5.9 per cent in 1981. Over the period 1975-81 the employed labour force grew by 315 thousand. Offsetting a decrease of 24 thousand engaged in agricultural pursuits were the large increases in other economic sectors. The number engaged in the service industries rose by over 100 thousand, in construction by over 50 thousand, in trade occupations by 46 thousand and in the oil and gas industry by over 40 thousand.

The "participation rate" is the proportion of the population, aged 15 years and over, in the labour force.

In 1981, Alberta's overall labour force participation rate was the highest in Canada at 71.6 per cent. The high and increasing participation rates experienced in Alberta can be attributed to the volume of job opportunities which led to a large in-migration of young people in recent years. While the male participation rate only rose by 2.3 per cent (from 82.4 per cent to 84.7 per cent) between 1975 and 1981, that of females rose by nearly 9 per cent (from 49.6 per cent to 58.5 per cent). In passing, it may be noticed that the female participation rate rose from just over 20 per cent in 1951 to the current just under 60 per cent.

Since 1975 the greatest growth was recorded in the managerial, administrative and professional occupations. The number engaged in clerical, service, construction and processing occupations rose somewhat less spectacularly. The only decrease was in the number engaged in agricultural occupations.

Since the early 1960's, and especially since 1971, Alberta's Gross Domestic Product has risen dramatically. The increased economic activity has been based largely on much expanded investments and expenditures in various aspects of the oil and gas industry. In addition, new developments in the petrochemical, forestry, coal, and agricultural products processing sectors provided additional stimuli. The increased economic activity created buoyant and sometimes strained labour market conditions throughout the province. Such boom circumstances in labour markets, in turn, led to an unprecedented influx of in-migrants from other regions of Canada and an expansion in the education and training system to train both in-migrants and the native-born for the occupational skills needed. This training should assist individuals in meeting any adverse labour market developments as well as prepare them for the opportunities which the future holds.

Table 6.20 **Labour Force - Male and Female and Participation Rates by Age Group - Alberta - 1951, 1961, 1971** (as of June 1)

	Labour Force	15-19	20-24	25-34	35-44	45-54	55-64	65 +	Total
1951	Male (000)								
	Participation rate %								
	Female (000)								
	Participation rate %								
1961	Male (000)								
	Participation rate %								
	Female (000)								
	Participation rate %								
1971	Male (000)								
	Participation rate %								
	Female (000)								
	Participation rate %								

Table 6.21 **Labour Force - Male and Female and Participation Rates by Age Group - Alberta - 1975-1981** (annual averages)

	Labour Force	15-19	20-24	25-34	35-44	45-54	55-64	65 +	Total
1975	Male (000)								
	Participation rate %								
	Female (000)								
	Participation rate %								
1976	Male (000)								
	Participation rate %								
	Female (000)								
	Participation rate %								
1977	Male (000)								
	Participation rate %								
	Female (000)								
	Participation rate %								
1978	Male (000)								
	Participation rate %								
	Female (000)								
	Participation rate %								
1979	Male (000)								
	Participation rate %								
	Female (000)								
	Participation rate %								
1980	Male (000)								
	Participation rate %								
	Female (000)								
	Participation rate %								
1981	Male (000)								
	Participation rate %								
	Female (000)								
	Participation rate %								

Table 6.22 **Population of Working Age, In and Not In Labour Force, Employed and Unemployed, and Participation Rates - Male and Female - Alberta - 1973-1981** (figures in thousands unless otherwise indicated)

	1973	1974	1975	1976	1977	1978	1979	1980	1981
Population 15 years +									
Male									
Female									
Total	1,150	1,190	1,244	1,302	1,356	1,409	1,463	1,523	1,586
Labour Force									
Male									
Female									
Total	746	781	822	871	909	960	1,015	1,072	1,136
Not In Labour Force									
Male									
Female									
Total	404	409	422	430	447	449	448	451	450
Employed									
Male									
Female									
Total	706	754	788	837	868	915	976	1,032	1,093
Unemployed									
Male									
Female									
Total	39	27	34	34	41	45	39	40	43
Unemployment Rate (%)									
Male									
Female									
Total	5.3	3.5	4.1	4.0	4.5	4.7	3.9	3.7	3.8
Participation Rate (%)									
Male									
Female									
Total	64.8	65.6	66.1	66.9	67.0	68.2	69.4	70.3	71.6

*Figures may not add due to rounding.

Table 6.23 Employed Labour Force by Industry*, Annual Averages - Alberta - 1975-1981 (thousands)

Industries	1975	1976	1977	1978	1979	1980	1981
Agriculture							
Other Primary							
Manufacturing							
Construction							
Transportation, Communications & Other Utilities							
Trade							
Finance, Insurance & Real Estate							
Service							
Public Administration							
Total							

*Comparable data not available prior to 1975 due to major revisions to the Statistics Canada Monthly Labour Force Survey.

Table 6.24 Employed Labour Force by Occupation, Annual Averages - Alberta - 1975-1981 (thousands)

	1975	1976	1977	1978	1979	1980	1981
Managerial, Administrative							
Clerical							
Sales							
Service							
Primary							
Processing							
Construction							
Transportation							
Materials Handling & Other Crafts							
All Occupations	786	837	868	915	976	1,032	1,093

NOTE: Comparable data not available prior to 1975 due to major revisions to Statistics Canada's Monthly Labour Force Survey.

Labour

In Canada responsibility for labour relations is shared among the federal, provincial and territorial governments. Broadly defined, the federal jurisdiction includes banks, international and interprovincial transportation and communications, broadcasting, grain elevators and most Crown Corporations. Enterprises not regulated by the federal government come under the jurisdiction of the province or territory where they are located. Approximately 90 per cent of employees in Alberta are regulated by provincial legislation.

The principal legislation regulating labour relations in Alberta is the Labour Relations Act. In addition there are other acts that regulate labour relations for specific groups of employees. These acts include: The Colleges Act, which regulates labour relations between boards of governors of post-secondary educational institutions and academic staff employees; the Firefighters and Policemen Labour Relations Act, which regulates labour relations between municipalities and firefighters and policemen; and the Public Service Employee Relations Act, which regulates labour relations for civil servants employed by the province of Alberta. Policemen, firefighters and provincial public servants are prohibited from striking.

Like every other jurisdiction in Canada, Alberta has legislation that sets minimum employment standards.

The Employment Standards Act establishes minimum standards for hours of work, payment of wages, overtime pay, minimum wages, vacations, vacation pay, general holidays, general holiday pay, termination of employment, maternity benefits, and the employment of young persons. While employers may set higher standards, they cannot give employees less than the minimum standards.

In addition, the province has enacted special legislation governing the lumbering and mining industries.

The Industrial Wages Security Act gives employees in the lumbering and mining industries added wage protection. Responsibility for administering the Employment Standards Act and the Industrial Wages Security Act rests with Alberta Labour and further information concerning the requirements of the legislation may be obtained by contacting the department.

As outlined in the Labour Relations Act, the Labour Relations Board is an independent, quasi-judicial tribunal that is responsible for the administration of procedures that regulate labour relations between employers and trade unions under the jurisdiction of the Act. Pursuant to the Act, the Board processes applications for certification and the revocation of trade unions as bargaining agents, regulates the procedure by which a trade union may proceed to a lawful strike or an employer to a lawful lockout. The Board also deals with the registration of employers' organizations in the construction industry and with unfair labour practices.

Pursuant to the Labour Relations Act, Alberta Labour also provides assistance to unions and management in resolving collective bargaining disputes through mediation. Mediation takes place at the request of either or both parties in a dispute or by order of the Minister of Labour.

The Pension Benefits Act and the Individual's Rights Protection Act also affect employer-employee relations in Alberta. The Pension Benefits Act requires that all pension plans covering employees in Alberta comply with certain standards and are registered with the Superintendent of Pensions, who is director of the Pension Benefits Branch of Alberta Labour. The Pension Benefits Branch is also responsible for investigating complaints and answering enquiries from employees concerning their pension plans.

The Individual's Rights Protection Act prohibits discrimination in the areas of race, colour, religious beliefs, ancestry, age, sex, marital status, place of origin or physical characteristics with respect to employment practices and employment advertising. The Act is administered by the Alberta Human Rights Commission.

Alberta has the fourth largest labour force in Canada with only Ontario, Quebec and British Columbia ranking higher. In Alberta in 1981, there were 1,136,000 persons over the age of 15 working or looking for work, either part-time or full-time. This figure includes 674,000 males and 462,000 females. Alberta continues to have the highest participation rate of any province in Canada, which means that a large percentage of Alberta's population is in the work force. Approximately 72 per cent of Albertans over the age of 15 are working or willing to work.

As a proportion of the work force, Alberta's trade union membership is one of the lowest in Canada. According to a 1980 survey, approximately 243,000 people belonged to trade unions in Alberta.

The largest union membership is in the public sector, which includes provincial and municipal employees as well as health care, education and utilities workers. Outside the public sector, the commercial and industrial construction industries are the most heavily unionized.

Education and Training

Alberta's educational system ranges from pre-school programs through to university postgraduate study. Included among the goals of the system are the teaching of basic subjects and skills, the creation of a skilled workforce, and the provision of opportunities for acquiring knowledge.

Pre-school programs are not universal in Alberta, but are becoming increasingly important. For those attending classes for grades one to twelve, education is provided on a "no-charge" basis. It is now customary for students to stay in this system for a longer period of time, and for more students to complete basic schooling in preparation for further education. High school curricula include matriculation (which leads to university or college), general diploma, and vocational programs, or combinations of these. There are academic high schools, vocational high schools and composite high schools.

The advanced education system in Alberta includes 25 post-secondary institutions, 81 further education councils, and industry based training programs. The post-secondary institutions currently receiving funding from the Alberta government include four universities, the Banff Centre, ten public colleges, three private colleges (for university transfer programs), two technical institutions, four adult vocational centres, and a petroleum industry training centre. (Provision has also been made for the establishment of an additional technical institute at Stony Plain near Edmonton).

During the 1980-81 period, post-secondary institutions served more than 300,000 persons through full-time, part-time, apprenticeship credit, non-credit, and further education programs.

In 1980-81, approximately 130,000 people were served by the four universities and the Banff Centre. Approximately 31,000 of these were in full-time attendance at the Universities of Alberta, Calgary and Lethbridge. The University of Alberta in Edmonton is the oldest and largest of the four. The University of Calgary, at first a separate campus of the University of Alberta, became autonomous in 1966. These two major universities offer a large number of degree courses, and have full faculties in professions such as medicine, engineering, law, dentistry, and education.

The University of Lethbridge was added to the system in 1967. Athabasca University was established in 1970 to provide part-time home study opportunities. The Banff Centre for Continuing Education includes the Banff School of Management and the Banff School of Fine Arts.

The Southern Alberta Institute of Technology in Calgary, established in 1916, and the Northern Alberta Institute of Technology in Edmonton, established in 1963, offer a wide variety of vocational, business education and technology-oriented programs. Facilities are also provided for apprenticeship training in certain designated trades. About 10,800 full-time day students attended the two institutions in 1980-81. The total number of individuals served is in the order of 82,000 including night course and apprenticeship participants. These institutions prepare students for career-oriented employment in industrial services and have a primary role in creating and maintaining an adequate supply of well-trained manpower.

Education and training authorities receive, from operational advisory committees comprised of members of the industrial community, valuable advice and assistance in both the design and the development of the numerous technological programs. The industrial community is concerned with the need to secure trained personnel relevant to job requirements.

The development of a college system in Alberta is recent, although some of the individual colleges have had long histories of educational service. In general terms, the colleges provide both university accredited courses and other programs which are designed to meet specific educational requirements. Recognition of the value of these institutions is shown by the increasing enrolment in vocational programs. During 1980-81, public colleges served approximately 95,000 persons, with private colleges providing university level training to about 930.

Public colleges are situated in Calgary, Edmonton, Fairview, Fort McMurray, Grande Prairie, Lethbridge, Lloydminster/Vermilion, Medicine Hat, Olds and Red Deer. The colleges in Fairview, Lloydminster/Vermilion, Fort McMurray, and Olds are designed to complement the specialized nature of their regions. Their curricula include a wide range of subjects related to agriculture, home economics, academic training, and technical upgrading. They also serve as bases for further post-secondary education in other institutions. Currently, apprenticeship programs are offered in the colleges situated in Fairview, Fort McMurray, Lethbridge, Lloydminster/Vermilion, Medicine Hat, Olds and Red Deer. Private colleges offering university accredited programs operate in Camrose, Edmonton, and near Lacombe.

The Alberta Vocational Training Program is designed to train or retrain adults to make them more employable and to provide prerequisites for further post-secondary education. Four vocational centres are located in Calgary, Edmonton, Lac La Biche and Grouard. To complement them, about twenty smaller units, known as "community vocational centres" have been established in isolated northern communities. In 1980-81, these

institutions served approximately 25,000 people through credit and non-credit programs.
In addition to the major institutions and their programs, the government also administers training programs for nursing aides and laboratory and X-ray technicians, administers the Vocational Rehabilitation of Disabled Persons program, provides training in forestry through the Forestry Technology School, offers a unique training service in the petroleum industry through the Alberta Petroleum Industry Training Centre, has one of Canada's leading schools for the deaf, and operates a business management program in small rural centres throughout the province.

Non-government educational training organizations include six nursing schools in hospitals. There are a number of licensed private colleges and privately-owned and operated trade and correspondence schools offering a range of pre-employment business courses.

The apprenticeship program is a vital factor in the provision of a skilled workforce. The program covers 42 designated trades. Each apprentice must spend specified time periods each year in technical classes. In conjunction with the technical class work, apprentices are indentured to employers who provide on-the-job training and experience. Wages are paid in accordance with experience and prevailing journeyman rates of pay. There were 9,502 first year apprentices indentured at the end of 1981, and the total number of registered apprentices increased by 10 per cent over the previous year to an all-time high of 28,157. (Alberta, with about 10 per cent of Canada's population, trains roughly 22 per cent of Canada's apprentices). Minimum educational requirements for each of the trades may be waived if the candidate can successfully complete a standard evaluation examination.

Legislation makes it obligatory for government to consider requests, when the need is indicated by interested groups of employees and employers, for the organization of new apprenticeship training programs. If agreement is reached that there is both a need and demand for tradesmen with particular skills, new trade training programs may be established. All trade courses are periodically reviewed by advisory committees of employers, employees, instructors and apprenticeship supervisors.

Under the terms of the Adult Occupational Training Agreement, the federal government provides financial support for on-the-job programs, for training-in-industry programs, for upgrading and retraining of the work force, and for initial training in specific skills. The provincial government has instituted a similar program to provide financial assistance to help individuals obtain training in industry.

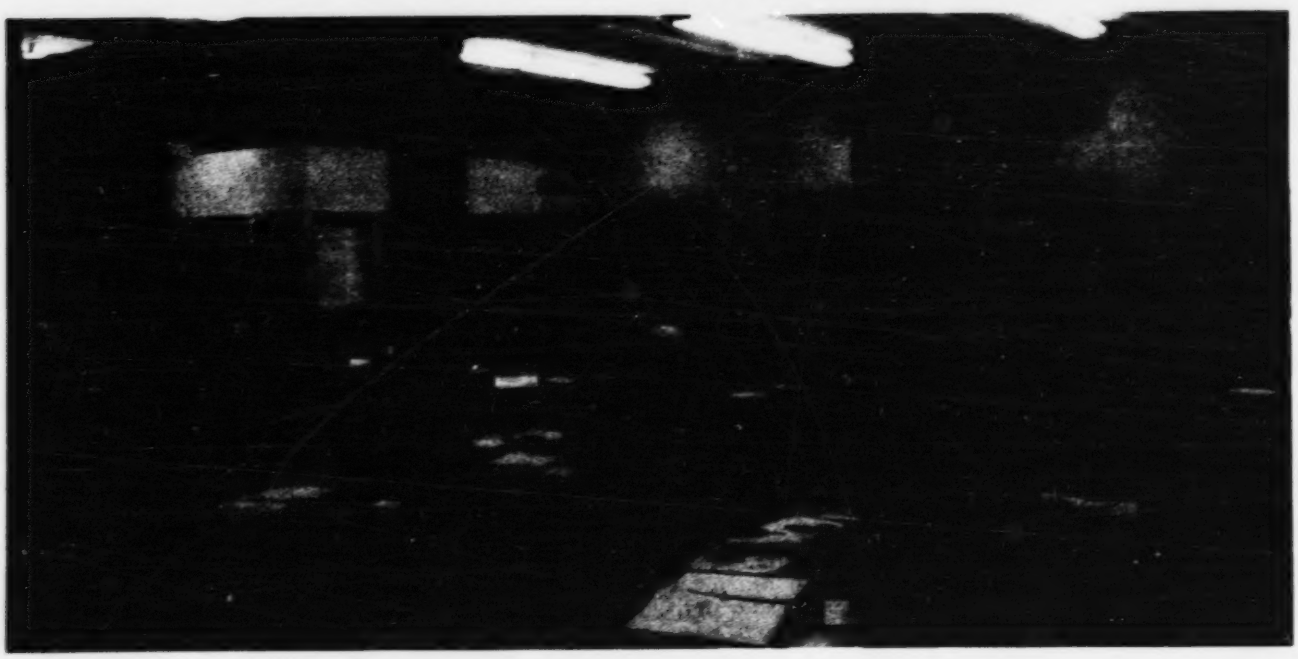


Table 6.25 **Students in Public and Separate Schools, in Universities, and in Public Colleges - Alberta -Selected Years - 1905/06-1980/81**

	Public & Separate Schools	University of Alberta	University of Calgary	University of Lethbridge	Athabasca University	Public Colleges	Technical Institutes
1905/06							
1915/16							
1924/25							
1935/36							
1945/46							
1955/56							
1965/66							
1970/71							
1971/72							
1972/73							
1973/74							
1974/75							
1975/76							
1976/77							
1977/78							
1978/79							
1979/80							
1980/81							

Table 6.26 **Numbers of Schools, School Rooms, Teachers and Student/Teacher Ratios, in the Alberta Public School System - Selected Years - 1905/06-1980/81**

	Schools	School Rooms	Teachers	Student/Teacher Ratio
1905/06				
1915/16				
1925/26				
1935/36				
1945/46				
1955/56				
1965/66				
1966/67				
1967/68				
1968/69				
1969/70				
1970/71				
1971/72				
1972/73				
1973/74				
1974/75				
1976/76				
1976/77				
1977/78				
1978/79				
1979/80				
1980/81				

Table 6.27 **Apprentices Registered and Certificated, Educational Requirements, and Length of Apprenticeship Training Period - Alberta - 1981**

	Registered Apprentices	Completed Apprenticeship	Journeyman Certificates Issued	Minimum Education Grade	Length of Apprenticeship Years or Periods
Agricultural Mechanic					
Appliance Serviceman					
Auto Body Mechanic					
Baker					
Barber					
Beautician					
Boilermaker					
Bricklayer					
Cabinetmaker					
Carpenter					
Communication Electrician					
Cook					
Electrical Rewind Mechanic					
Electrician					
Electronic Technician					
Elevator Constructor					
Elevator Constructor Improver					
Floorcovering Mechanic					
Gasfitter					
Glassworker					
Heavy Duty Mechanic					
Heavy Equipment Operator					
Instrument Mechanic					
Insulator					
Ironworker					
Lather					
Machinist					
Millwright					
Motor Mechanic					
Painter and Decorator					
Partsman					
Plasterer					
Plumber					
Power Lineman & Electrician					
Refrigeration Mechanic					
Roofer					
Sheet Metal Mechanic					
Sprinkler Fitter					
Steamfitter-Pipefitter					
Steel Fabricator					
Tile Setter					
Transport Refrigeration-Mechanic					
Water Well Driller					
Welder					
Totals	28,157	4,360	9,887		

Table 6.28 **Apprentices Registered, Attending School, Receiving Certification, and Examinations Written - Alberta - 1971-1981**

Apprentices	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Registered											
Attending School in Block of Formal Training											
Certificates issued											
a) Indicating Completion of Apprenticeship											
b) Indicating Permanent Journeyman Status											
Examinations Written											

Communications

The sheer size of Canada has made modern communications a vital element in the country's development. Alberta is no exception to this national pattern.

Broadcast media have extensive coverage. The average household has more than one radio. There are 36 AM and 9 FM radio broadcast originating stations, as well as 72 rebroadcast stations. A total of 12 television stations, based in Edmonton, Calgary, Lethbridge, Lloydminster, Medicine Hat and Red Deer are in operation. All but two of these stations are affiliated with nation-wide networks. Some 104 rebroadcast stations provide virtually province-wide coverage. Nearly every household now owns a television set; almost 90 per cent have a colour set. Major centres receive cable television connecting them with American networks. The Alberta government operates a radio and television network (ACCESS) which emphasizes educational programming.

The more remote regions of northern Alberta benefit from the communications satellite "Anik", through which the Canadian Broadcasting Corporation provides radio and television programming to sparsely populated areas throughout northern Canada.

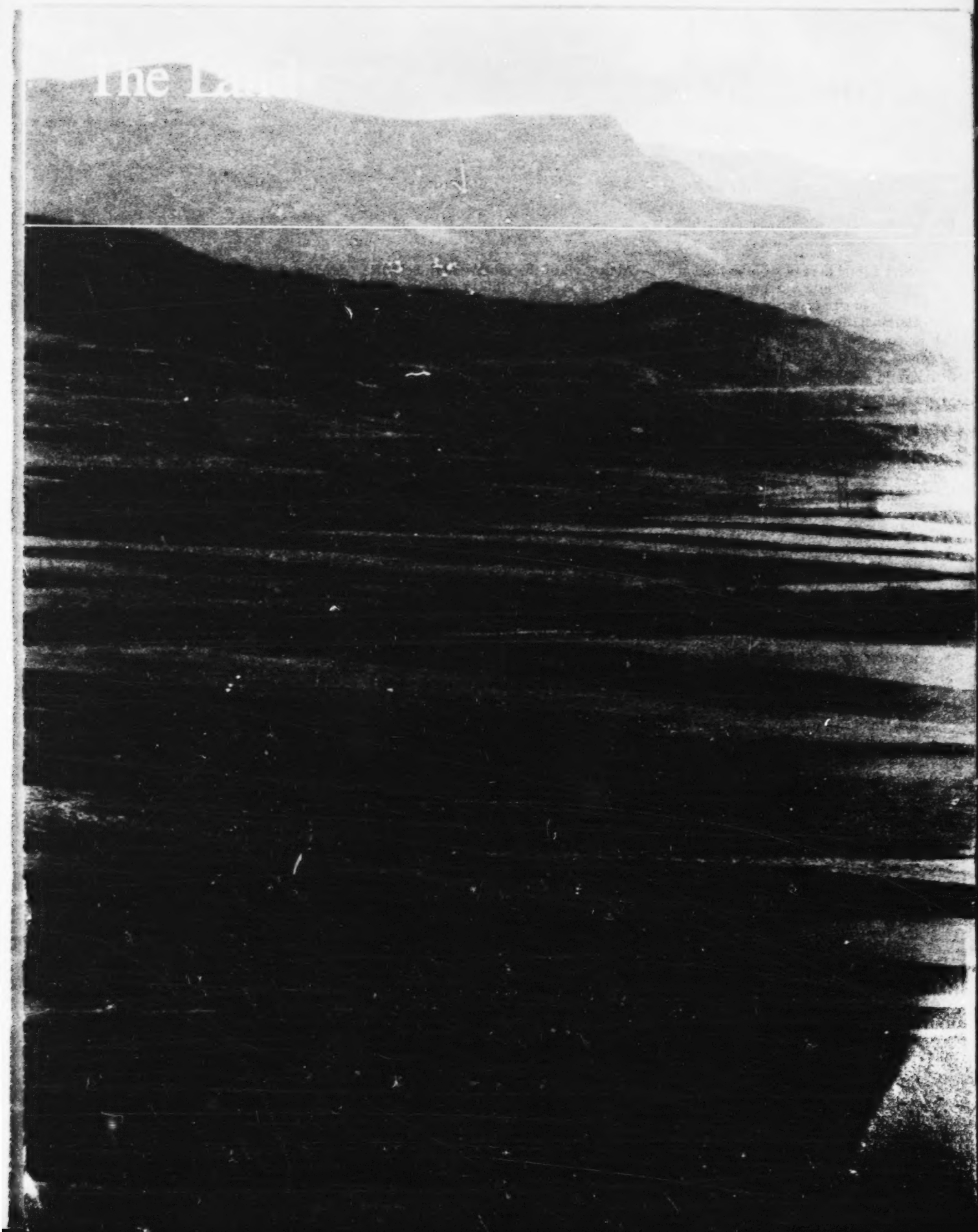
Nine daily, and 129 weekly, newspapers are published. The dailies are published in Calgary, Edmonton, Lethbridge, Medicine Hat, Red Deer, Grande Prairie and Fort McMurray. They have a total circulation of nearly 540,000 copies, reaching almost 85 per cent of all households in the province. Weekly newspapers report a gross circulation of over one million copies.

Alberta's magazine publishing trade is also growing as commercial printing plants improve and upgrade their equipment. Regular publications serve such specialized fields as the oil industry, agriculture, leisure, and business development. A number of the publications have international circulation.

Albertans are among the country's greatest telephone users with almost 1.9 million telephones and extensions in the service of 2.2 million persons. Alberta Government Telephones, a Crown corporation, owns over 1.3 million of these phones. The City of Edmonton operates Edmonton Telephones, which has more than 500,000 phones.

A radio-telephone system provides much-needed contact with isolated areas not serviced by ground telephone lines. A microwave network, owned by Alberta Government Telephones (a partner in the Trans Canada Telephone system) and by Canadian National-Canadian Pacific Telecommunications, extends to almost every area of the province. Both have national and international links. CN-CP Telecommunications provides wire service in many Alberta centres.

In addition to the communication services outlined above, there are numerous privately-owned film companies, art houses, advertising agencies, printing operations and publishers.



Geography

With a total area of over 66 million hectares, Alberta is approximately the combined size of West and East Germany, the Netherlands, Belgium, Luxembourg, Switzerland, Denmark and Sweden in Europe, or of the 13 northeasternmost states of the United States.

Alberta is one-fifteenth of Canada in area. Situated in the northwestern part of North America between 49 degrees and 60 degrees north latitude and 110 degrees and 120 degrees west longitude, it is 1,217 kilometres in length from north to south and between 293 and 650 kilometres in width from west to east. Within this area, there is a great diversity and abundance of natural resources.

The northeastern corner of Alberta is largely an ice-scoured plain, a part of the Canadian Shield. The potential for development of agriculture and forestry is limited because of climate, topography and location. Wildlife and recreation have extensive rather than intensive use.

Almost all of the southwestern belt of mountains and foothills ridges has been glaciated several times. Some of the outlying foothill ridges and most of the higher peaks were not over-run by moving ice, but most areas exhibit striking features of alpine glaciation. Alpine glaciers and icefields, indicating an approximate balance between winter snowfall and summer melting, are present today on some of the higher mountains. Post-glacial erosion and deposition, including landslides where unstable formations were left unsupported, and the irregular clothing of slopes by vegetative cover, have added to the scenic diversity.

Mountain peaks range up to 3,747 metres in elevation and the larger mountains are rugged, with local relief of up to 2,130 metres. Major passes are between 1,128 and 1,830 metres in elevation. The larger broad glaciated valleys have shallow slopes, thus allowing relatively easy road and rail development into and through the mountains. Use conflicts are developing in major highway belts and in potential mining areas but only small parts of this large region are intensively used. Much of the mountainous region lies in National and Provincial Parks and Provincial Forest Reserves. The latter are zoned for watershed, wildlife, recreation, mining, commercial grazing, forestry and multiple purpose uses.

The greater area of Alberta is part of the Interior Plain of North America and is underlain by sedimentary rock. Younger, softer formations predominate at surface levels. Rock weathering has produced relatively fine textured soil materials. Continental glaciation from the Hudson Bay region extended to the foothills where it joined with ice of alpine origin. Only the upper parts of the Cypress and Porcupine Hills were not covered by ice.

Some surfaces have been eroded by ice and meltwaters, but most have received materials borne by them. Large amounts of soil material of

Shield origin, including the harder stones and boulders present, are widely distributed. Yet most of the drift is of relatively local origin. An important feature of deglaciation was that the general slope of the land was toward the melting continental ice mass. Meltwaters and run-off from land surface were ponded against the ice front at successively lower levels across the plains. The clays which were widely deposited are among the best parent materials for soil development and the flat to gently undulating terrain is excellent for agricultural activities. Undulating to rolling till plains and many kinds of moraines are present, and include many hummocky moraines deposited by "dead ice". The rougher topography and numerous sloughs in moraine areas are disadvantageous for agriculture, but cultivation is not uncommon because the soil is often relatively stone-free and erosion problems are not as great as in more humid regions. Moraine areas are among the best for wildlife, particularly the numerous migratory waterfowl and shore birds. Gravel deposits are widely available.

The general surface slope is from west to east in southern Alberta and from southwest to northeast in northern Alberta. Elevations range from approximately 1,220 metres in the foothill valleys to less than 215 metres in the northeast near the margin of the Shield. Numerous uplands such as the Cypress, Porcupine, Swan, Clear, and Buffalo Head Hills and the Caribou, Birch and Pelican Mountains rise as high as 760 metres above the neighbouring plains. The local relief within the plains, has been accentuated by the incision of river valleys 30 to 230 metres in depth.

The Peace-Athabasca delta complex is the world's largest fresh water delta. Wildlife is abundant and the area has long been important in the fur trade. Other deltas are smaller, but many were formed on the shores of lakes in the past and most stabilized sand plains have developed on their materials.

Perceptions of flatness can be formed in some of the more extensive prairie plains, particularly in the south where there are few trees to accentuate relief. These perceptions are intensified by the clean dry air which permits one to see great distances. In reality, however, topographical diversity is quite great within the plains as evidenced by the rough foothills and mountain skyline in the west.

Alberta now has almost 30 per cent of the occupied agricultural land of Canada. This agricultural land area is almost three times that of Ontario, four times that of Quebec and over nine times that of British Columbia. In each of these other provinces, land is used that would be considered submarginal in Alberta.

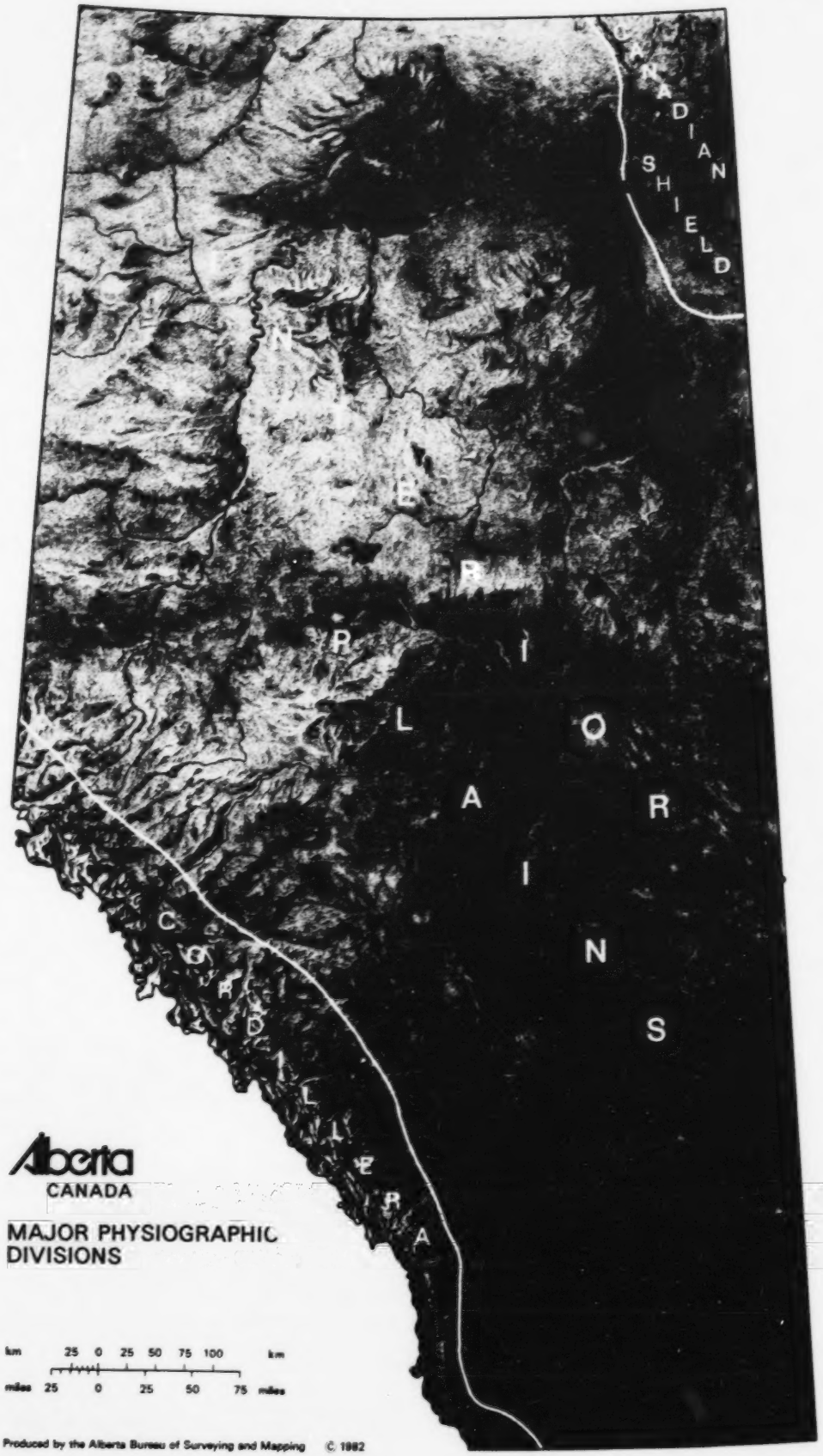
The soil patterns of Alberta reflect the influences of soil forming factors — parent materials, slope and drainage, climate and vegetation — acting through time and modified by human use. The effects of the ice-age are still pronounced and local variations are numerous. Post-glacial erosion and deposition, weathering of bedrock and of drift of various origins, and organic build-up are all reflected in soil patterns.

The brown, dark brown and black soils and the dark grey wooded soils have developed under grass cover in semi-arid and sub-humid climates. Water surpluses are inadequate for much soil leaching; thus, humus and fine mineral soil are abundant in fertile surface horizons. Water deficits are greatest in the brown soil zone where vegetative cover densities have not been great enough for major humus development. Cultivation ranges from about one-quarter of the brown soil zone to two-thirds of the black soil zone. Only one-third of the dark grey wooded soils are cultivated, largely because these soils are less fertile. Because more humid climates prevailed in recent centuries, tree cover has replaced the grass and soil qualities have been degraded to some extent. The more humid climate is advantageous for crop growth, particularly in light of growing emphasis on forage crops. Much of the recent expansion of cultivated land has been in these areas.

Grey wooded soils, developed largely under mixed forest cover, are the most widespread. Only 5 to 10 per cent of these soils are cultivated, mainly because of frost and drainage limitations and low fertility. Leaching has not been as great as in more humid forest regions because moisture surpluses are minimal and most soils are moderately high in lime content.

Podzol soils are present in some of the most humid upland areas. Such soils are more acidic and are rarely cultivated. Solonetizic soils have developed largely in grassland areas where parent materials are saline. Some are cultivated but they are less productive than adjoining grassland and parkland soils. Organic soils are widespread in the more humid forest areas but, because better soils are available elsewhere, few have been drained or cultivated. Permafrost is a factor in drainage limitation in some northern areas.

Cultivation is expanding in Alberta, partly in new land (largely in the Peace River region) and partly within settled areas where farmers are clearing, draining, and otherwise intensifying their use of areas not previously developed. Reversion of cropland to forest and rough pasture is also taking place and some of the better lands are being converted to urban and industrial uses. There is a greater potential for expansion of cultivated land areas in Alberta than in any other province but the better undeveloped lands are of limited extent.


CANADIAN SHIELD
ROCKY MOUNTAINS
INTERIOR PLAINS
CORDILLERA
Alberta
CANADA
MAJOR PHYSIOGRAPHIC DIVISIONS
km 25 0 25 50 75 100 km
miles 25 0 25 50 75 miles
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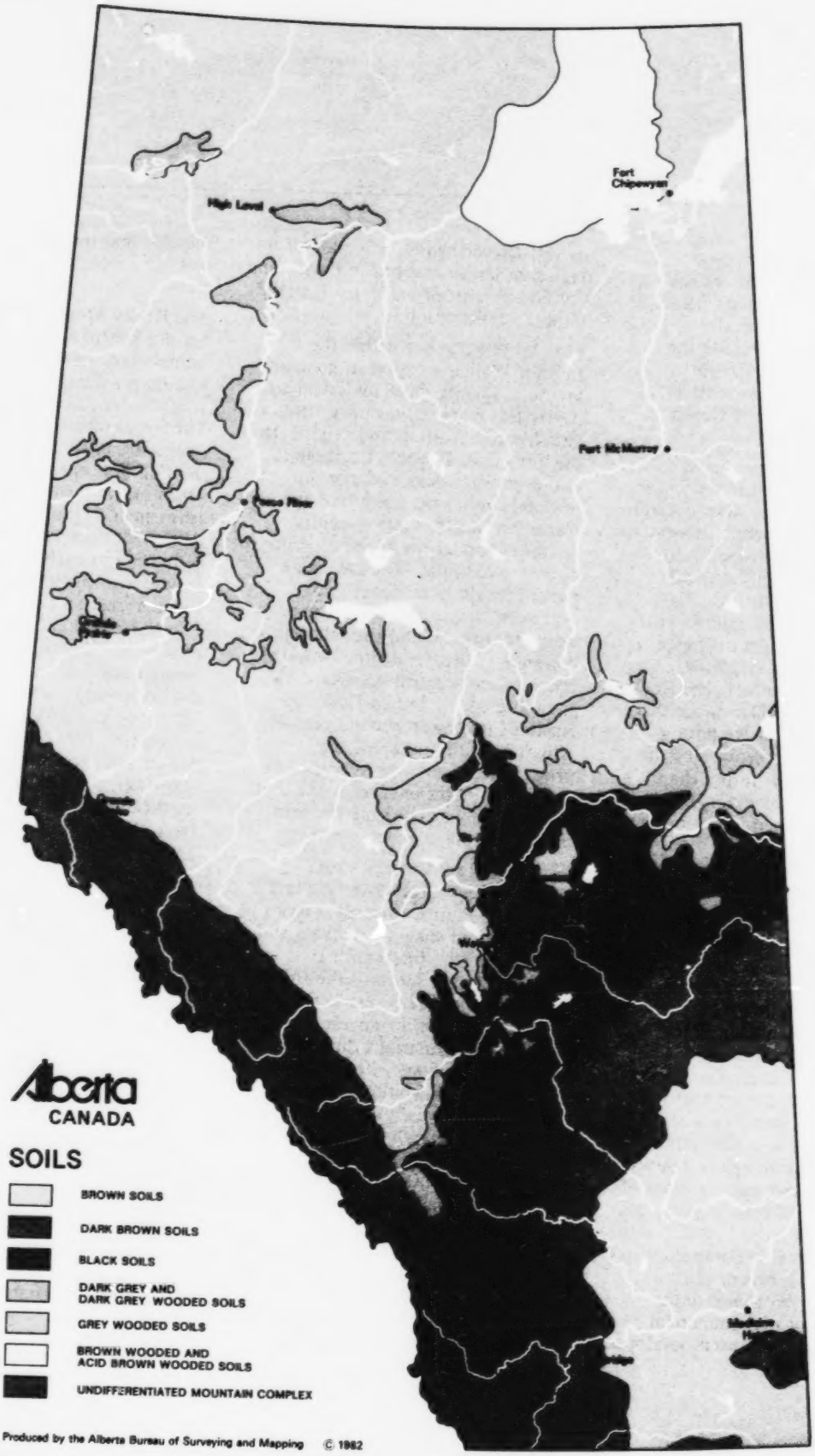

Fort Chipewyan
High Level
Fort McMurray
Peace River
Grande Prairie
Alberta
CANADA
SOILS
BROWN SOILS
DARK BROWN SOILS
BLACK SOILS
DARK GREY AND DARK GREY WOODED SOILS
GREY WOODED SOILS
BROWN WOODED AND ACID BROWN WOODED SOILS
UNDIFFERENTIATED MOUNTAIN COMPLEX
Produced by the Alberta Bureau of Surveying and Mapping © 1982

Geology

Except for its extreme northeast corner, Alberta forms part of the western Canada sedimentary basin, a large area extending from the International Boundary along the southern margin of the Prairie Provinces to the Mackenzie River delta bordering the Arctic Ocean.

The region is underlain by sedimentary rock formations of different ages deposited in ancient seas and low-lying alluvial or coastal plains which covered much of western Canada during the Paleozoic and Mesozoic eras (500 million to 60 million years ago). During early Tertiary time, about 50 million years ago, the western margin of the basin was uplifted, and the strata were folded and faulted to form the Rocky Mountains and foothills. Since then, the geologic history of western Canada has involved erosion of the plains and mountains rather than deposition in a sedimentary basin (except for a brief period during the Pleistocene epoch when unconsolidated glacial sediments of various types were deposited on the bedrock surface).

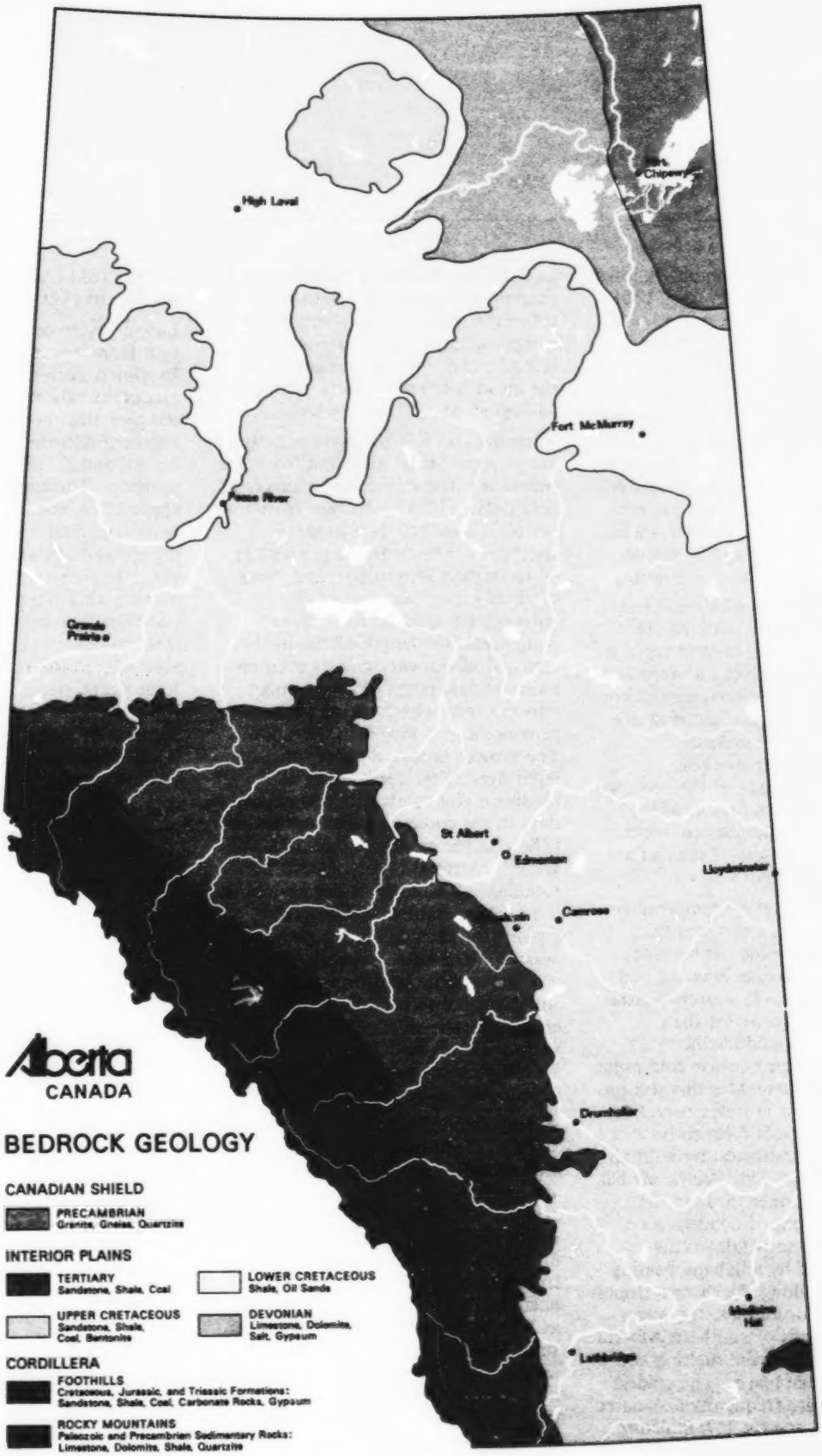
Three major physiographic divisions reflect the composition and structure of the bedrock formations of the province. The smallest of these divisions — the Canadian Shield — occupies about 15,540 square kilometres in the extreme northeast corner of Alberta, adjacent to Lake Athabasca. The Shield consists of ancient igneous and metamorphic rock of Precambrian age — mainly granite, gneiss, and various types of schist — which, in other regions of Canada, contain important deposits of metallic minerals. Some showings of uranium and molybdenum minerals have been found in the Shield rocks, but no commercial mineral deposits have been developed as yet. Nevertheless, only part of this region has been mapped in detail, and considerable scope exists for metallic minerals exploration.

Most of Alberta lies within the Interior Plains, a region of generally low to moderate relief underlain by nearly flat-lying sedimentary strata of variable composition and origin. In the northeast, Devonian carbonate and evaporite rocks underlie the lowlands about the margin of the Canadian Shield, dipping gently southwest under the cover of younger Cretaceous strata. The Devonian rocks contain large deposits of limestone, gypsum, and salt at or near the surface, and the salt deposits continue at greater depths beneath much of east-central Alberta. Also, the more deeply buried Devonian strata of northwestern and central Alberta contain much of the province's gas and oil reserves. They are found in ancient reef-rocks that grew in the seas covering the area during Devonian time.

Cretaceous and Tertiary strata comprise the bedrock over the larger part of the Plains, forming a series of sandstone and shale formations which extend from the International Boundary in the south to the British Columbia and Northwest Territories boundaries in the northwest. In general, the formations dip gently to the south and west, with the result that successively younger strata form the bedrock towards the margin of the Rocky Mountain Foothills. Cretaceous strata of the Plains contain much of Alberta's mineral wealth, including the Athabasca and Cold Lake oil sands, the subbituminous (thermal) coal deposits of central and southern Alberta, and a significant portion of the conventional oil and gas reserves. They also contain major deposits of metallic and industrial minerals, including iron, bentonite, and kaolin clays.

The Rocky Mountains and Foothills form a belt of folded and faulted sedimentary strata from 40 to 200 kilometres wide, extending along the southwestern margin of the province. The strata range in age from Precambrian to Tertiary. In general, the Foothills are composed of sandstone and shale formations of Jurassic and Cretaceous ages, and the Rocky Mountains proper are composed of carbonate and quartzite formations ranging in age from Precambrian to Triassic. The Foothills contain important reserves of sour gas and high grade bituminous coal, much of which is of coking quality. Vast reserves of limestone and dolomite are found within the front ranges of the Rocky Mountains, and scattered deposits or showings of other industrial and metallic minerals have been reported from this region.

Except for some of the higher ridges in the Rocky Mountains and the Cypress Hills in the southeast, the province was covered by thick ice sheets during the Pleistocene epoch, (approximately 10,000 to 15,000 years ago). Consequently, much of the land surface is covered by unconsolidated glacial sediments ranging from a few inches to several hundred feet in thickness. The deposits vary widely in composition, consisting of sand, gravel, clay and unsorted mixtures of all three materials (till). Although glacial deposits obscure or otherwise hinder development of underlying bedrock mineral deposits in some areas, they provide much of the sand and gravel used in the construction industry, and also some of the clay and silica sand used in manufacturing such products as brick and fiberglass.


High Level
Fort McMurray
Peace River
Grande Prairie
St Albert
Edmonton
Lloydminster
Camrose
Drumheller
Medicine Hat
Lethbridge
Alberta
CANADA
BEDROCK GEOLOGY
CANADIAN SHIELD
PRECAMBRIAN
Granite, Gneiss, Quartzite
INTERIOR PLAINS
TERTIARY
Sandstone, Shale, Coal
LOWER CRETACEOUS
Shale, Oil Sands
UPPER CRETACEOUS
Sandstone, Shale, Coal, Bentonite
DEVONIAN
Limestone, Dolomite, Salt, Gypsum
CORDILLERA
FOOTHILLS
Cretaceous, Jurassic, and Triassic Formations: Sandstone, Shale, Coal, Carbonate Rocks, Gypsum
ROCKY MOUNTAINS
Paleozoic and Precambrian Sedimentary Rocks: Limestone, Dolomite, Shale, Quartzite
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Climate

Alberta has what is commonly known as a continental climate: long, cold winters and mild summers. A combination of several factors determine the province's climate.

The continental interior location of the province results in greater heating in summer and cooling in winter, and in less precipitation than is present in marine areas. The mountain barriers to the west accentuate these patterns by inhibiting the flow of mild, moist air from the Pacific, and by easing the flow of cold air from the north.

In summer the flows of air and the resulting temperature patterns are modified by the drop in land surface elevations as one moves eastward and northward. The ever-changing storm and air-mass movement patterns are based largely on the pressure contrasts resulting from these controls. The latitude of the province is another important factor, as the length of the summer day counteracts the decreasing altitude of the sun as one moves northward.

In January, the average temperature is about -8 degrees Celsius in the southwestern foothills. It becomes colder as one moves northward and eastward to about -25 degrees Celsius in the northeast corner of the province. These cold northern temperatures occur because cold polar continental air dominates this section. Although cold air at times covers the whole province, it is frequently replaced in the southwest by mild air from the Pacific. This Pacific air has become even warmer through the release of the heat of condensation from the heavy snowfalls in the mountains, and by adiabatic heating as it descends along the eastern slopes of the Rocky Mountains, the warm "chinook" winds of southern Alberta are dry, and significant melting and evaporation take place. The coldest temperatures are frequently associated with low wind speeds, low moisture content, and clear skies; thus the cold is not felt so bitterly as in more humid, windy areas.

In July the temperature gradients are shallow with the longer days and lower elevations of the north largely compensating for the difference in latitude. For most of the province, the mean temperatures lies between 15 degrees and 20 degrees Celsius.

In spring and fall, air mass contrasts are greater than in July; the frost-free period is often shortened by surges of cold polar air. The average frost-free period is over 120 days in the southern lowlands and is as short as 60 to 70 days in northern and more elevated areas. Because of the tendency for cold air to lie in low-lying areas, the length of the frost-free period can vary greatly even on an individual farm. The growing season varies with location in the province and is longer in the south. The growth potential index ranges from over 3,000 degree days at Medicine Hat to about 1,600 degree days in the coolest agricultural areas. (The number of degree days of growth potential is derived by totalling the number of degrees above a base temperature of 5 degrees Celsius for each day in the growing season). The large areas of Alberta with favourable landforms and heat sufficient for cereal grains and other crops, plus the smaller southern areas with sufficient heat for irrigated specialty crops, give the province a great potential for agriculture.

Average annual precipitation is about 300 mm in the Milk River Basin, and along the Red Deer River as it approaches the Saskatchewan boundary. It is over 500 mm along the eastern foothills and, in some mountain locations, over 1,500 mm. In the hill country above 54 degrees north latitude, annual precipitation is as high as 550 to 600 mm. In winter, snow is usually associated with a low pressure centre located in Alberta or in the up-slope to the north of the low. Summer rain usually comes either in the form of showers and thunderstorms formed because of surface heating, or from the storms along a cold front as it sweeps southward over the province.

Low-pressure centre "storm tracks" pass from west to east across Alberta. In winter, such storm tracks are predominantly south of the border, but they shift northward into southern Alberta in spring, and into central and northern Alberta in summer. The tracks fluctuate appreciably and there may be wide variations from "normal" precipitation in any given season or year. In summer, warm, moist, tropical air from the Gulf of Mexico occasionally moves into Alberta and relatively heavy rains are experienced, especially in the south and east. In some years, these rains are widespread, in others, absent. Summer drought of varying intensity is widespread, particularly in the southeastern plains.

Winter snowfall is relatively light on the plains. With frequent chinooks in the southern plains and foothill areas, winter grazing by livestock and game is possible. The melting of snow in spring results in increased soil moisture levels and in the greater part of annual stream runoff. Both vary because of fluctuations in snowfall, snowdrift distribution, winter melting and evaporation (largely by sublimation), infiltration capacities, frost pattern, surface detention storage, and other factors. Some of these factors can be modified by tillage and watershed management practices.

Summer precipitation in most agricultural areas is exceeded by the potential combined evaporation and transpiration by plants; spring moisture surpluses are usually exceeded by the deficits of late summer and fall. On the drier plains, summer fallowing is common in alternate years. The deficiencies of crop years may be reduced by as much as 60 mm of extra soil moisture from the years under fallow. Facilities are available for irrigating

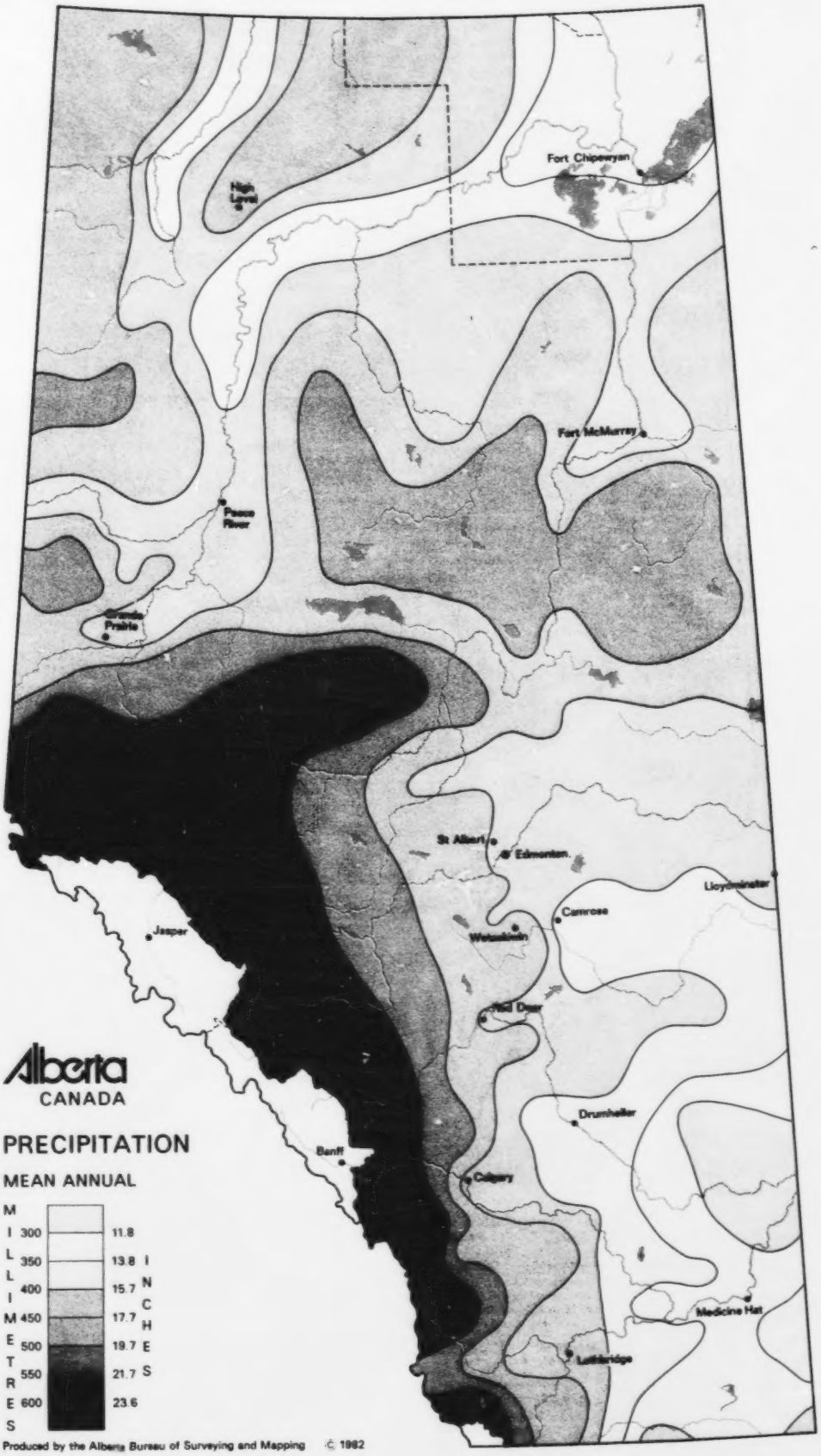
over 400,000 hectares of the drier plains.

In many forest areas, water surpluses are larger and water deficits small or absent in most years. In drier years, growth is inhibited and fires set by lightning are widespread. Surplus and deficiency patterns are closely reflected in many other vegetation, soil and agricultural patterns. For example, erosion by rain and running water is much less of a problem than in more humid areas of Canada.

Table 7.1 **Standard 30 Year (1951-1980) Normals of Temperature, Precipitation, and Frost - Representative Locations - Alberta**

Location	Altitude (metres)	Temperature °C Extreme Max.	Extreme Min.	January Mean Daily Max.	January Mean Daily Min.	July Mean Daily Max.	July Mean Daily Min.	Precipitation mm Mean Annual Rain-fall	Precipitation mm Mean Annual Snow-fall	Frost Free Days Mean
Acme										
Aden										
Alliance										
Altawan										
Amisk										
Andrew										
Athabasca										
Banff										
Beaver Mines										
Bowden										
Bow Island										
Brooks										
Calgary										
Calmar										
Camrose										
Cardston										
Claresholm										
Cold Lake										
Coleman										
Columbia Ice Fields										
Consort										
Coronation										
Cowley										
Craigmyle										
Crossfield										
Drumheller										
Eckville										
Edmonton										
Edson										
Elk Point										
Ellerslie										
Empress										
Entrance										
Foremost										
Forestburg										
Fort Assiniboine										
Fort Chipewyan										
Fort Macleod										
Fort McMurray										

Location	Altitude (metres)	Temperature °C Extreme Max.	Extreme Min.	January Mean Daily Max.	January Mean Daily Min.	July Mean Daily Max.	July Mean Daily Min.	Precipitation mm Mean Annual Rain-fall	Precipitation mm Mean Annual Snow-fall	Frost Free Days Mean
Fort Saskatchewan										
Ghost RS										
Grande Cache										
Grande Prairie										
Hanna										
High Level										
High River										
Hinton										
Jasper										
Jenner										
Kananaskis										
Lac La Biche										
Lacombe										
Lethbridge										
Lloydminster										
Manyberries										
Medicine Hat										
Milk River										
Olds										
Oyen										
Peace River										
Pincher Creek										
Raymond										
Red Deer										
Rimbey										
Robb										
Rochester										
Rocky Mountain House										
Sedgewick										
Shining Bank										
Sibbald										
Stettler										
Strathmore										
Taber										
Thorsby										
Three Hills										
Trochu										
Turner Valley										
Valleyview										
Vauxhall										
Vegreville										
Vermilion										
Viking										
Vilna										
Vulcan										
Wanham										
Wetaskiwin										
Whitecourt										


Fort Chipewyan
High Level
Fort McMurray
Peace River
Grande Prairie
St Albert
Edmonton
Lloydminster
Camrose
Jasper
Wetaskiwin
Red Deer
Drumheller
Banff
Calgary
Medicine Hat
Lethbridge
Alberta
CANADA
PRECIPITATION
MEAN ANNUAL
MILLIMETRES
300
350
400
450
500
550
600
INCHES
11.8
13.8
15.7
17.7
19.7
21.7
23.6
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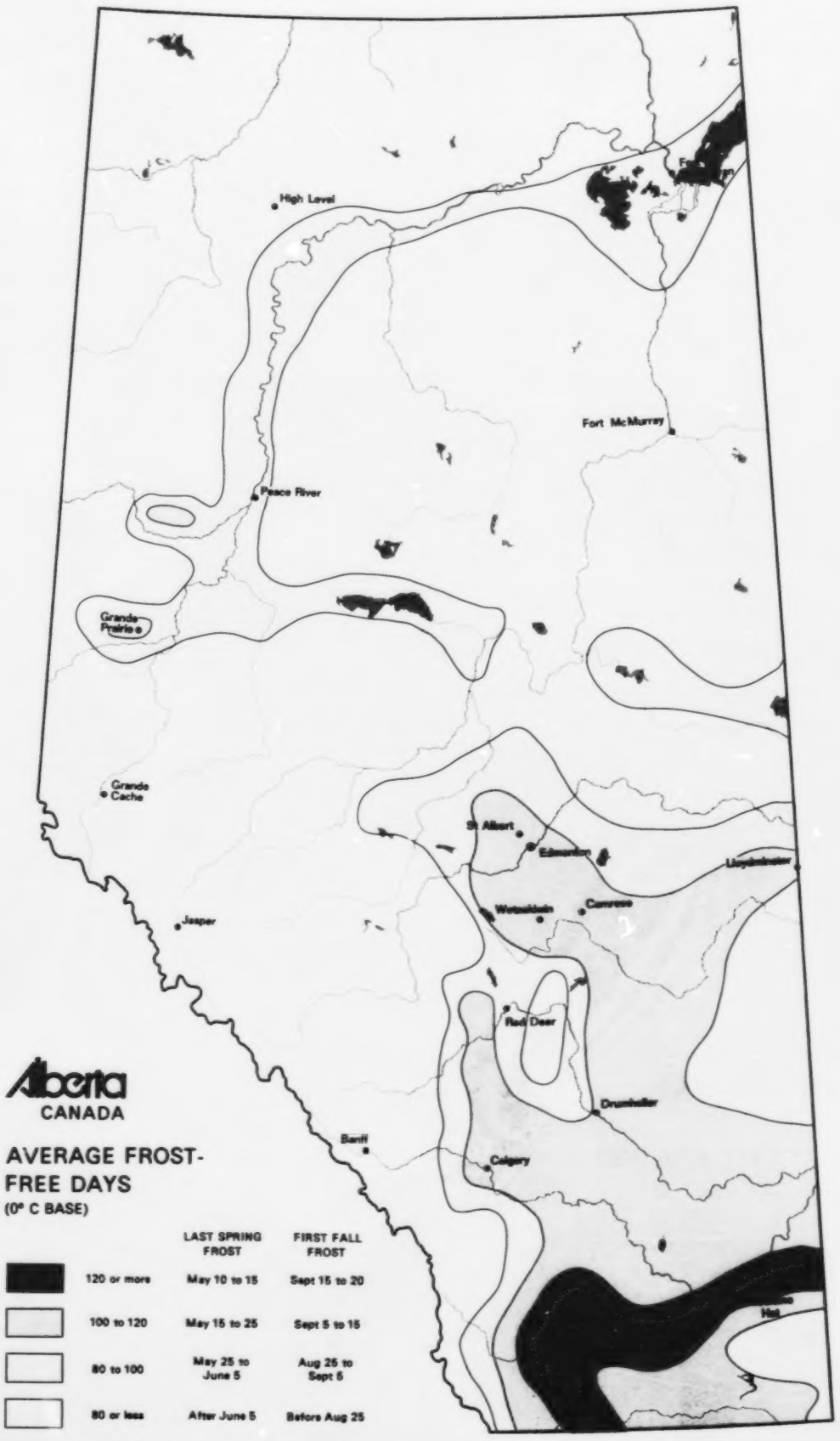
High Level
Fort McMurray
Peace River
Grande Prairie
Grande Cache
Jasper
St. Albert
Edmonton
Lloydminster
Wetaskiwin
Camrose
Red Deer
Drumheller
Banff
Calgary
Hat
Alberta
CANADA
AVERAGE FROST-FREE DAYS
(0° C BASE)
LAST SPRING FROST
FIRST FALL FROST
120 or more
May 10 to 15
Sept 15 to 20
100 to 120
May 15 to 25
Sept 5 to 15
80 to 100
May 25 to June 5
Aug 25 to Sept 5
80 or less
After June 5
Before Aug 25
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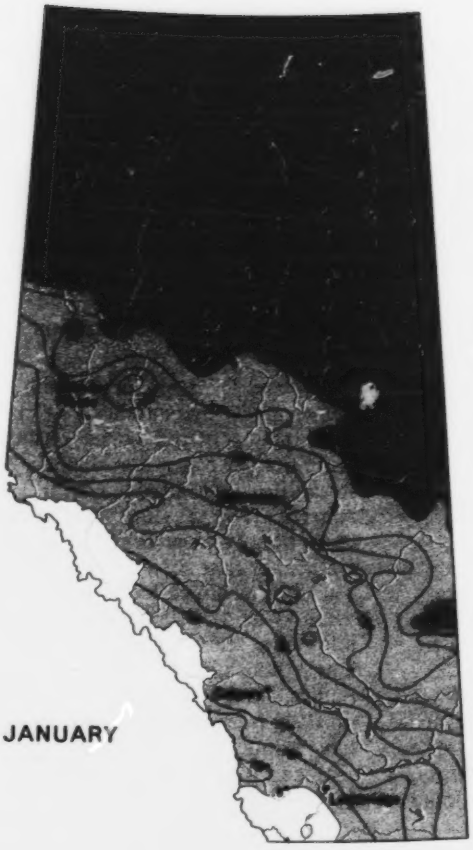
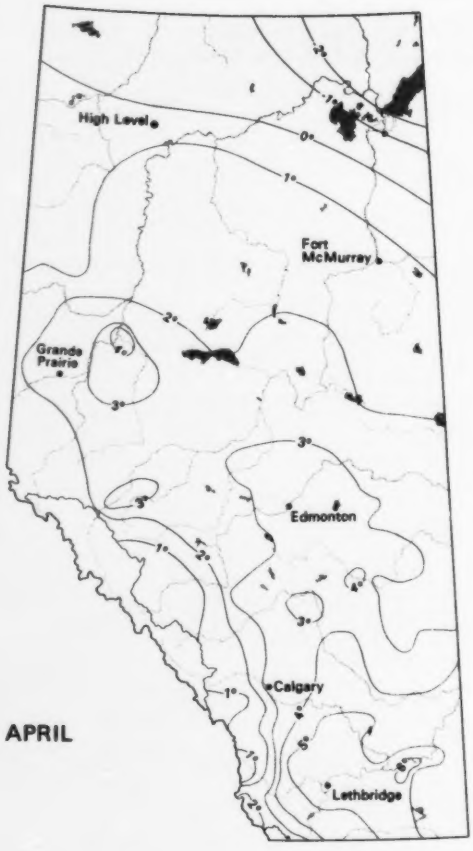


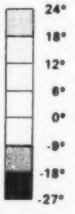
JANUARY



APRIL

Alberta
CANADA

MEAN TEMPERATURE



ISOTHERMS IN DEGREES CELSIUS

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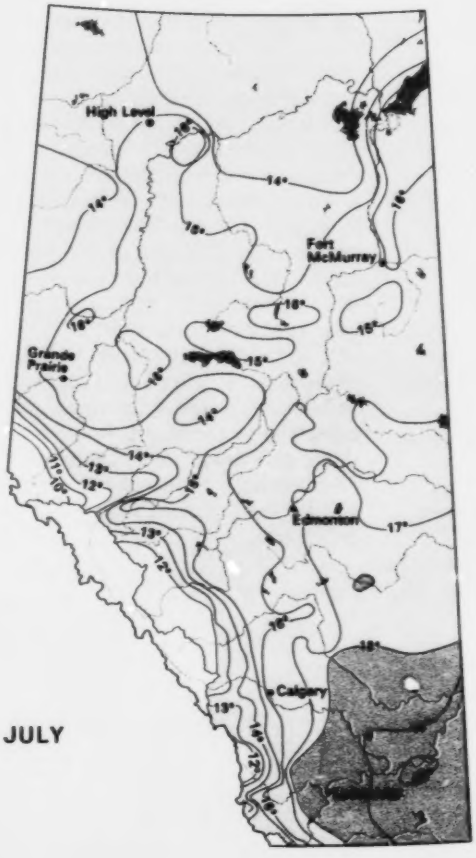
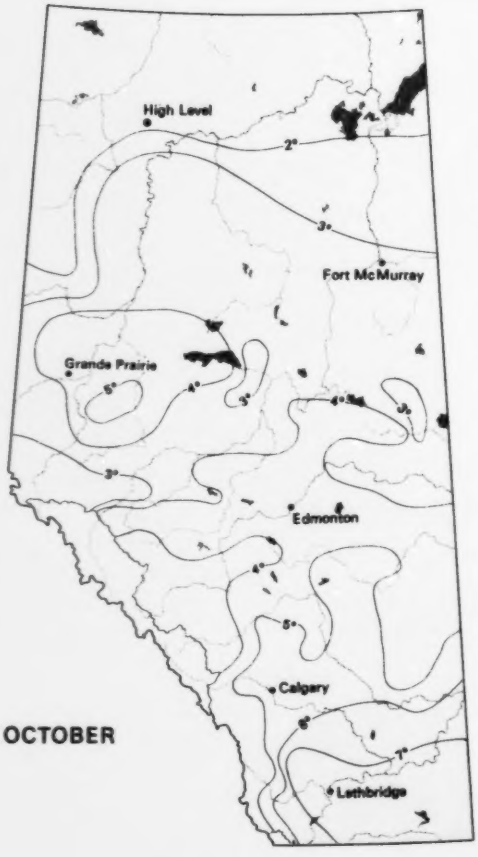


JULY



OCTOBER

Water Resources

Water is found in relative abundance in many areas of the province although climatic differences result in considerable variation in supply from one region to another.
Approximately 64 per cent of the land area of Alberta lies within the Mackenzie River system. The river basins that form the Mackenzie system in Alberta (the Athabasca, Peace, Slave and Hay rivers) account for 87 per cent of mean annual river discharges leaving the province. The Churchill and Saskatchewan-Nelson river systems (the Beaver, North Saskatchewan, Battle, Red Deer, Bow, Oldman and South Saskatchewan rivers) cover 35 per cent of the province's land area but contribute only 13 per cent of mean annual river discharges.

Based on mean annual values, the streamflow originating within Alberta is 67.7 billion cubic metres (54.9 million acre feet) per year. An additional 67.3 billion cubic metres (54.6 million acre feet) per year flow in from British Columbia, Saskatchewan and the United States. Less than 10 per cent of water originating in Alberta is withdrawn annually for local use. The other source of water supply is groundwater, which is highly variable in both quantity and quality.

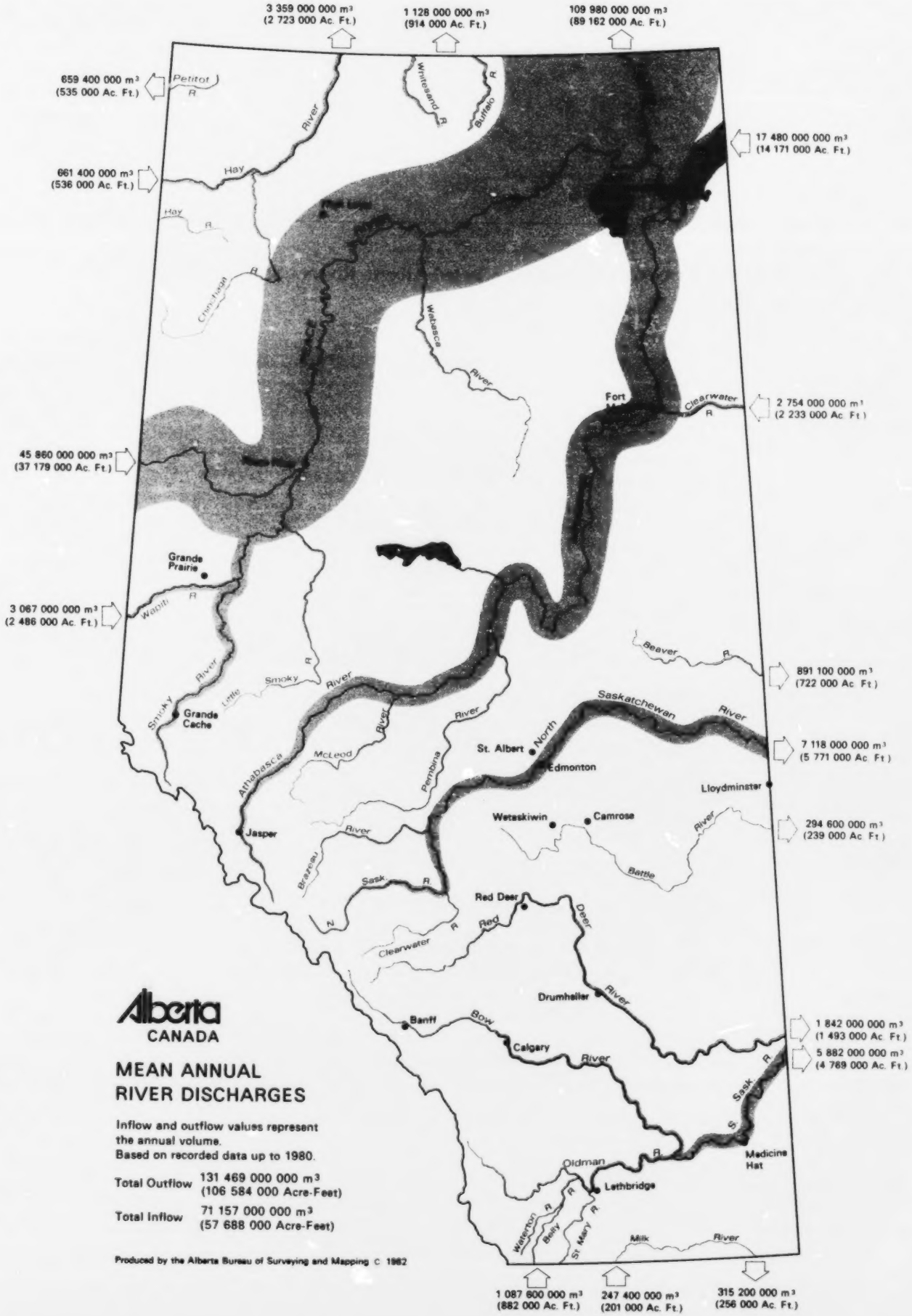
Seasonal variations in flow are characteristic of Alberta rivers and streams. In most years, the greater part of water volume is derived from melting snow. In some years, heavy rains, particularly if they occur in spring or early summer before soil moisture supplies have been depleted, contribute to high water yields.

In the drier southern plains, the average annual water yield is less than 25 mm; in some locations it may range from zero in many years to as much as 110 mm in years with heavy snowmelt and spring rain runoff. Streamflow is flashy, turbid and undependable. In the west-central and northern plains, the average surpluses are from 25 to 100mm. These also vary greatly from year to year but they are more likely to provide for more dependable full season flow. Local hill areas within the plains have larger and more sustained yields. The Cypress Hills give rise to many streams of regional importance for irrigation and stock-watering. Other hills, especially in the north, have much larger yields than the adjoining plains.

The largest and most dependable streamflow rises in the mountain and foothills region where average annual yields range from 100 to 1,300 mm. In dry years, as much as 90 per cent of the streamflow of the North and South Saskatchewan basin originates in the mountain and foothills region which has only 15 per cent of the basin area. In wet years, the proportion of flow from this region may be less than 70 per cent, largely because of the higher rainfall on the plains. This flow is more dependable and it has a better seasonal distribution and better quality than that of the plains areas. Reservoir storage is contributing to water regime improvement for hydropower, urban, industrial and irrigation purposes.

Rivers and lakes are large and numerous by the standards of many drier regions of the world; yet little more than two per cent of the streamflow of Canada rises in Alberta. The province has slightly more than two per cent of the freshwater lake area of the country. The area occupied by lakes is usually listed as being 16,800 square kilometres, but this does not include many thousands of temporary water bodies, small potholes, marshes and muskeg areas that in spring would have a much larger cumulative water surface. Many of these dry up in summer and fall. Others, in addition to many of the larger lakes, have seasonal fluctuations in water level.

Alberta has over half the consumptive use of diverted water in Canada, largely because it has the greatest area under irrigation. Secondary recovery of oil and gas is resulting in significant volumes of water being pumped into bedrock formations. Oil sands development, with its major losses of steam and evaporated water from plants and tailings ponds (which remain open throughout the winter) is resulting in the growing use of water. With careful water management for a wide range of uses, Alberta will be able to meet requirements well into the future. Regional and seasonal deficiencies in the drier years,, especially in the south, involve a wide range of management techniques oriented both to increasing supplies and to using limited supplies more efficiently.



Alberta
CANADA

MEAN ANNUAL RIVER DISCHARGES

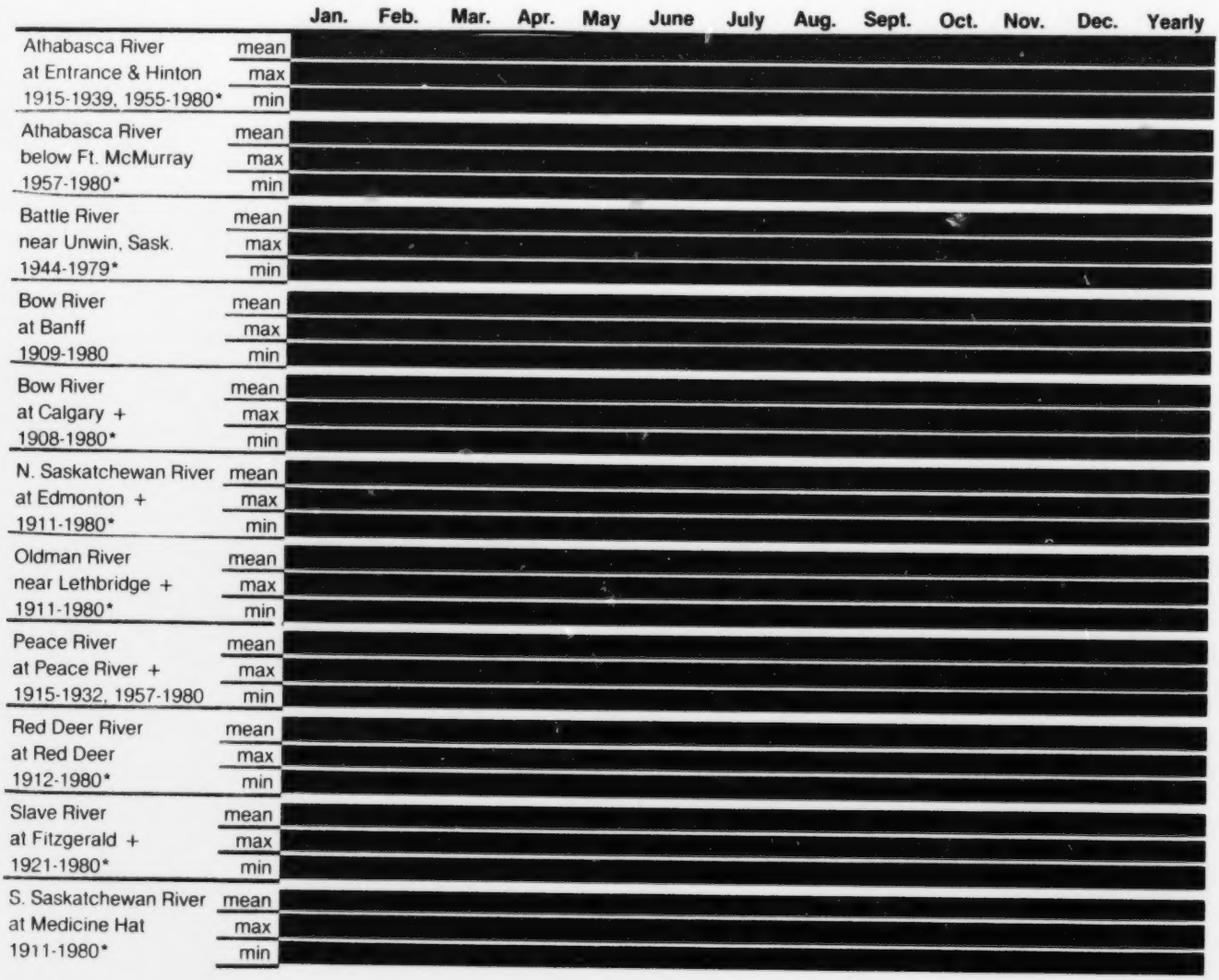
Inflow and outflow values represent the annual volume.
Based on recorded data up to 1980.

Total Outflow	131 469 000 000 m³ (106 584 000 Acre-Feet)
Total Inflow	71 157 000 000 m³ (57 688 000 Acre-Feet)

Produced by the Alberta Bureau of Surveying and Mapping © 1982

Table 7.2 Monthly and Annual Discharges, Selected Alberta Rivers - Specified Periods

(cubic metres per second)



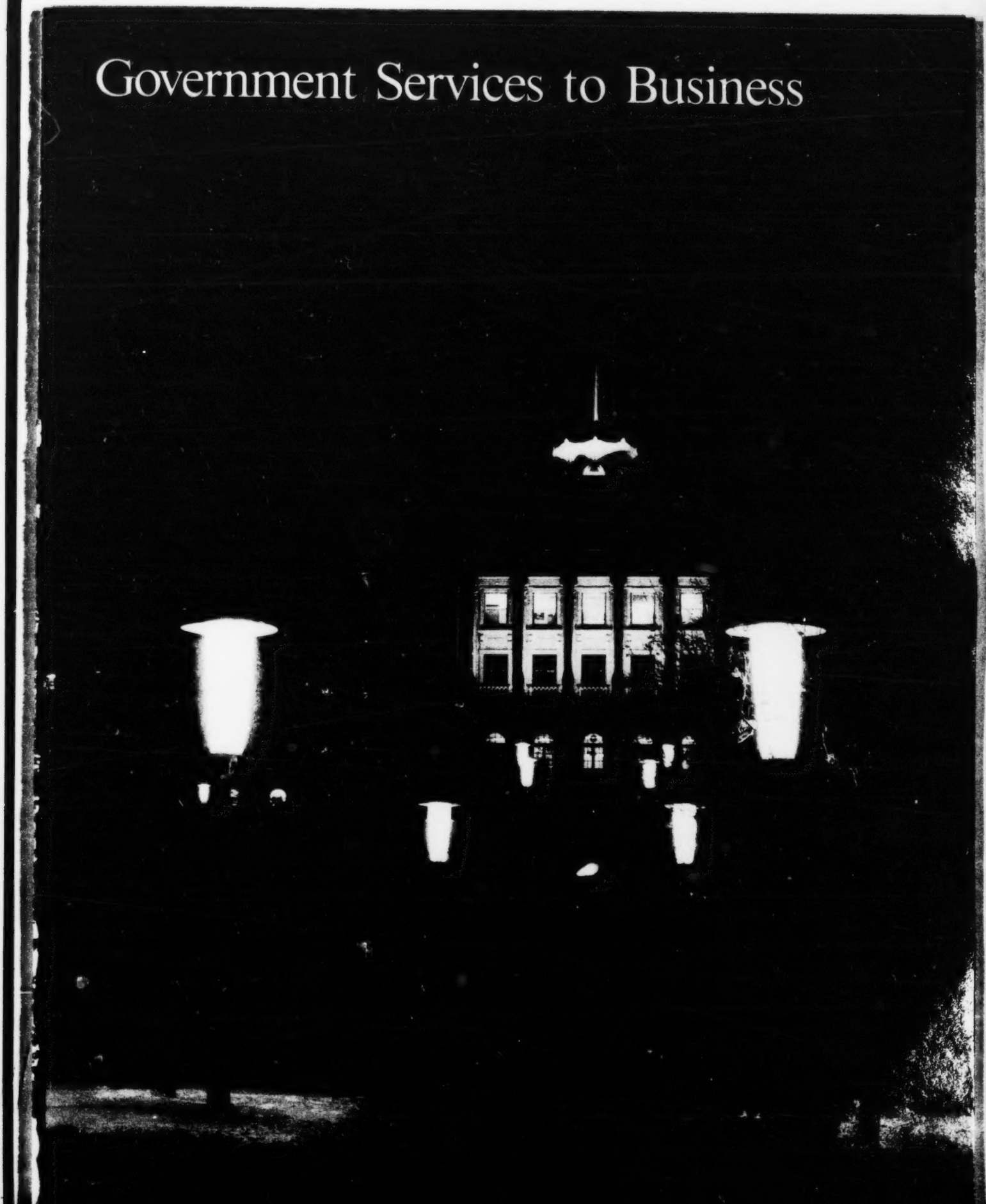
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly
Athabasca River at Entrance & Hinton 1915-1939, 1955-1980*	mean													
	max													
	min													
Athabasca River below Ft. McMurray 1957-1980*	mean													
	max													
	min													
Battle River near Unwin, Sask. 1944-1979*	mean													
	max													
	min													
Bow River at Banff 1909-1980	mean													
	max													
	min													
Bow River at Calgary + 1908-1980*	mean													
	max													
	min													
N. Saskatchewan River at Edmonton + 1911-1980*	mean													
	max													
	min													
Oldman River near Lethbridge + 1911-1980*	mean													
	max													
	min													
Peace River at Peace River + 1915-1932, 1957-1980	mean													
	max													
	min													
Red Deer River at Red Deer 1912-1980*	mean													
	max													
	min													
Slave River at Fitzgerald + 1921-1980*	mean													
	max													
	min													
S. Saskatchewan River at Medicine Hat 1911-1980*	mean													
	max													
	min													

* Incomplete data (relatively few months or years missing, other than shown)

** Less than 1 cubic metre per second

\+ Regulated for part of period:
Bow River increasingly since 1913; North Saskatchewan River since 1960; Peace and Slave since 1968; Oldman River and South Saskatchewan River for most of the record period.

Government Services to Business



Government Services to Business

A number of government agencies are equipped to gather, analyze, compile and publicize information for the purpose of furthering the industrial development of the province. Several are prepared to give assistance, financial and practical, in selecting industrial sites, starting or expanding production, developing markets, supplying technical information, developing products or production processes, and in industrial design. Following is a listing, with brief services' resumés, of provincial and federal government organizations which provide assistance related to industrial development. Though not listed here, many cities and other municipal corporations also provide comprehensive services with greatest emphasis on securing best suitable site selection. For more complete information, please contact the agency through the address given.

As an additional, and unique, service the government has established the Regional Information Telephone Enquiries (R.I.T.E.) network. It is designed to provide businesses and citizens of Alberta with a convenient, free of charge means of securing information from their government.

The system provides a convenient means for contacting the right department or individual in government by eliminating the costs of long distance calls and the need to enter into exchanges of correspondence. Detailed instruction as to use of the system is included in all regional telephone directories.

Provincial Government Services

Alberta Agricultural Development Corporation

The Agricultural Development Corporation is an agency of the Crown established within Alberta Agriculture which provides financial assistance to primary producers of agricultural products, the owners of associated businesses and agricultural industries.

The objectives of the agribusiness loan guarantee program, which is only one of the programs of the Agriculture Development Corporation, is to assist new agribusiness to become established and assist existing agribusiness to expand in order to increase the further processing of agricultural products and provide necessary services to primary producers, thus helping to make rural centres more viable.

Agribusiness enterprises which process primary products or provide a necessary service to farming enterprises and which are unable to obtain reasonable cost financing from other sources may apply for assistance under this program. The Corporation provides financial advisory services and, where the need is established, guarantees loans.

Loans are available to agricultural businesses for buildings, land, equipment, permanent improvements, operating funds and debt consolidation. Common applicants are owners of feed lots, greenhouses, feed mills, alfalfa plants and veterinary clinics.

General Manager
Agricultural Development Corporation
4910 - 52 Street
Camrose, Alberta
T4V 2V4

Alberta Bureau of Statistics

Provincial and sub-provincial statistical information of interest to Alberta industry and government decision-makers is available from the Alberta Bureau of Statistics.

This information includes the full range of Statistics Canada material, the Bureau's own published and unpublished data (e.g., on retailing and manufacturing, measures of economic growth, compensation, population projections, demographic and social statistics), as well as information from a number of other sources.

The Bureau also advises on the collection, compilation and dissemination of statistics.

Alberta Bureau of Statistics
Treasury Department
7th Floor, Sir Frederick W. Haultain Building
9811 - 109 Street
Edmonton, Alberta
T5K 0C8

Alberta Opportunity Company

The Alberta Opportunity Company is a Crown Corporation administering the Alberta Opportunity Fund. The purpose of the fund is to stimulate the establishment of new businesses and to assist in the expansion of existing enterprises. To achieve its purposes the Company may make loans, or guarantee loans of other lenders, and provide management counselling or other specialized services. A.O.C. only lends money when conventional financing is not available.

Except for resource-based industries, public utilities, finance companies, and suppliers of residential accommodation, most types of business operating for gain or profit are eligible for assistance. In considering applications, priority is given to Albertan-owned enterprises, to smaller businesses, to job-creating projects, and to businesses in smaller population centres.

Alberta Opportunity Company
P.O. Box 1860
Ponoka, Alberta
T0C 2H0

Alberta Research Council

The Alberta Research Council is a Crown Corporation dedicated to promoting responsible economic development in Alberta through science and technology. It provides a full range of services: pure and applied research; analytical laboratories; industrial engineering problem-solving. In 1982 it has a staff of over 500 working in laboratories and offices in Edmonton, Nisku, Red Deer, Calgary and Lethbridge. It operates under the authority of the Alberta Research Council Act.

The Alberta Research Council has identified five major areas of research: industrial and engineering research and assistance; oil sands; coal; natural resources; frontier sciences.

The industrial and engineering research program provides short-term advisory and technical services to manufacturing companies in Alberta. Services include computer access to reference information on 95 per cent of the world's published scientific and technical literature. These services and a financial assistance project are funded by the National Research Council. The program also includes projects in transportation, surface water engineering, forest products, electricity, alternate energy and energy conservation, and runs a gasoline and oil testing laboratory.

Oil sands research includes geological studies, heavy oil cracking, and in-situ recovery.

Coal research includes geological studies, liquefaction, pyrolysis, coal property definition, and gasification.

Natural resources research activities include geological surveys, soils surveys, groundwater, and atmospheric sciences.

Frontier Science projects include research into new catalysts, electro-organic reactions, low temperature biology, and enzyme design studies using genetic engineering techniques.

One of the Alberta Research Council's prime functions and highest priorities is to work closely in partnership with industry to provide businesses with the research capability they may require and cannot find in the private sector. Through this industrial strategy, Alberta businesses can develop new industrial opportunities in the province. The Alberta Research Council is willing to consider proposals on joint venture and contract projects or on other ways of doing business.

Alberta Research Council
4th Floor, Terrace Plaza
4445 Calgary Trail South
Edmonton, Alberta
T6H 5R7

Food Processing Assistance

The Alberta Department of Agriculture and the Federal Department of Regional Economic Expansion share costs in a program of assistance for those commercial operations in which raw or semi-processed nutritive products are altered, processed or refined, physically or chemically, or made more marketable for human, animal or plant consumption.

Assistance is given to firms processing products of plant or animal origin.

Grant assistance may be provided to firms engaged in full time commercial research on products of nutritional value or products of plant or animal origin, or processing activities related to these products.

Alberta Department of Agriculture
Nutritive Processing Agreement
9718 - 107 Street
Edmonton, Alberta
T5K 2C8

Department of Regional Economic Expansion and Industry,
Trade and Commerce
4th Floor, Cornerpoint Building
10179 - 105 Street
Edmonton, Alberta
T5J 1E2

Industry Development Branch

This branch advises and assists both in the establishment of new firms and industries and in the expansion of existing ones. It also provides other government departments with information on the activities and needs of various industries. In conjunction with the private sector, the branch identifies industrial opportunities; implements, administers and evaluates the government's economic development programs; and proposes, where appropriate, alternative industrial sector development policies, strategies and programs which contribute to the province's economic and social goals.

Industry Development Branch
Alberta Economic Development
9th Floor, Pacific Plaza
10909 - Jasper Avenue
Edmonton, Alberta
T5J 3M8

Northern Development Branch

Along with economic matters the Branch, as provincial co-ordinator of the Alberta North Subsidiary Agreement and the support group for the Northern Alberta Development Council, is concerned with the social aspects of northern Alberta development. These include manpower training, community infrastructure, education, law enforcement, housing conditions, health services, transportation and communications. The objective is to achieve balanced socio-economic growth in northern Alberta.

Northern Development Branch
Department of Tourism and Small Business
10018 - 101 Street
Peace River, Alberta
T0H 2X0

Strategic Planning Branch

The branch has three main areas of responsibility: policy analysis, economic planning and analysis, and research. Analyses and reviews of economic activities, institutions and policies are made to provide advice to government officials on the policy options available to achieve economic objectives. Businesses and government are provided with information on current and prospective economic conditions affecting the province. Research is undertaken to meet demands for economic and market information.

Strategic Planning Branch
Alberta Economic Development
10th Floor, Pacific Plaza
10909 - Jasper Avenue
Edmonton, Alberta
T5J 3M8

Trade Development Branch

The purpose of the branch is to assist Alberta's industrial and business consulting sectors to expand export sales activity. It works directly with individual companies or groups of companies to sell products and services outside Canada. Staff members assist companies in developing export sales. Activities of the branch include identifying export opportunities, organizing incoming buyer and outgoing sales missions, organizing and co-ordinating participation in trade shows, and providing specific expertise on foreign export projects.

Trade Development Branch
Alberta Economic Development
11th Floor, Pacific Plaza
10909 - Jasper Avenue
Edmonton, Alberta
T5J 3M8

Transportation Services Branch

The branch has the responsibility for reviewing and recommending programs, strategies and policies which will assist in the efficient transportation and distribution of Alberta products as well as the promotion of efficiency in passenger transportation. The branch advises industrial and trade groups with respect to transportation services and rates, as well as regulations and legislation pertaining to transportation matters.

Transportation Services Branch
Alberta Economic Development
10th Floor, Pacific Plaza
10909 - Jasper Avenue
Edmonton, Alberta
T5J 3M8

Small Business Division

This division of the Alberta Tourism and Small Business Department is divided into two branches: Small Business Assistance and Regional Business Development. Business analysts and business development representatives are situated throughout the province to assist persons who want to open a business or who are already in business. Services and programs provided include business counselling; small business guidance with information on starting, financing, marketing and operating businesses; a management assistance program, community economic development assistance; community profiles to assist in business location and expansion decisions; an industrial land program; and a business site locations program.

Small Business Division
Alberta Tourism and Small Business
19th Floor, Capitol Square
10065 - Jasper Avenue
Edmonton, Alberta
T5J 0H4

Federal Government Services

Business Information Centres are a new concept in business government communication. Set up and operated by the Government of Canada, the centres are designed to make it easier for business people to get in touch with appropriate federal government officials. The centres are staffed by personnel who can cut through "red tape" and provide the business person with a speedy answer to questions about government services, programs, opportunities, problems, policies, people, regulations, or other business matters affecting them.

Telephone 420-2952 in Edmonton or Zenith 0-3200 elsewhere in Canada.

Department of Industry, Trade and Commerce

Staff of the regional office of the Department provide information and guidance on industrial incentive programs, export opportunities, and ways of improving productivity. Assistance is given in market planning and in locating and evaluating new markets. Staff explain opportunities for participation in domestic and foreign trade fairs, missions, and other promotions; they provide counselling service for pricing, documentation, labelling, transportation modes, current regulations on import and export controls, and in identification of licensing and joint venture opportunities. They provide information on financial assistance programs, and on financing and insurance for exports.

The Enterprise Development Program helps selected small and medium sized manufacturing and processing firms to become more viable and internationally competitive by providing term loan insurance, grants for new product development, and consulting assistance.

A program entitled "Support for Technology Enhanced Productivity" (STEP) is designed to promote the manufacture and use of electronics in Canadian industry and includes both manufacturers and users.

The Export Market Development program helps eligible firms develop new export markets for products or services by providing financial assistance when participating in foreign trade shows, making first-hand market investigations, bringing in potential buyers bidding on major foreign projects or embarkation on a market penetration plan.

Through the Small Businesses Loans Act the Department provides loan financing for small businesses (firms with gross revenue below $1.5 million), for the purchase of machinery, equipment, land and buildings. The loans are guaranteed by the Department but are to be applied for at chartered banks, Alberta Treasury branches, or other lending institutions.

Department of Industry, Trade and Commerce
505 Cornerpoint Building
10179-105 Street
Edmonton, Alberta
T5J 3S3

Department of Regional Economic Expansion

The primary objective of the Department of Regional Economic Expansion (DREE) is to improve economic growth and social adjustment in slow growth areas of Canada. The Regional Development Incentives Act (RDIA), administered by DREE, encourages business and industry to invest in such designated areas. Development incentives for the establishment, expansion or modernization of secondary manufacturing and processing operations, and loan guarantees for selected commercial establishments, can be made available.

Department of Regional Economic Expansion
4th Floor, Cornerpoint Building
10179-105 Street
Edmonton, Alberta
T5J 3S3

In 1983 the functions of the Departments of Industry, Trade and Commerce and Regional Economic Expansion will be amalgamated. They will continue to be located in the Cornerpoint Building.

Export Development Corporation

The Export Development Corp. (EDC) is a Crown Corporation that provides a wide range of insurance, guarantee and loan services in order to facilitate and develop Canadian export trade.

EDC facilities are provided to enhance the ability of firms selling Canadian goods and services to compete effectively abroad. There is no minimum value of export business required to qualify for support.

Export Development Corporation
Suite 1030, One Bentall Centre
505 Burrard Street
Vancouver, British Columbia
V7X 1M5
Tel: (604)688-8658

Federal Business Development Bank

This Crown Corporation extends financial assistance to new or existing businesses of almost every type which do not have other sources of financing available to them on reasonable terms or conditions. It

gives particular attention to small enterprises.

Management Training seminars are conducted by the Bank at a moderate registration fee. The Bank also sponsors Counselling Assistance for Small Enterprises (CASE), a management counselling service wherein retired business persons act as counsellors on behalf of the Bank. This service is provided at a nominal fee and it supplements counselling services obtainable from the private sector.

1800 Century Place
9803 - 102A Avenue
Edmonton, Alberta
T5J 3A3

405 Pleasantview Professional Bldg.
11044 - 51 Avenue
Edmonton, Alberta
T6H 5B4

11574 - 149 Street
Edmonton, Alberta
T5M 1W7

404 - 6th Avenue, S.W.
Calgary, Alberta
T2P 0R9

Suite 230, 534 - 17 Avenue, S.W.
Calgary, Alberta
T2S 0B1

Suite 170, 3015 - 12 Street, N.E.
Calgary, Alberta
T2E 7J2

10601 Southport Road, S.W.
Calgary, Alberta
T2W 3M6

10135 - 101 Avenue
Grande Prairie, Alberta
T8V 0Y4

500 Professional Bldg.
740 - 4th Avenue, S.
Lethbridge, Alberta
T1J 0N9

Medicine Hat Inn
530 - 4th Street, S.E.
Medicine Hat, Alberta
T1A 0K8

Riverside Office Plaza
4919 - 59 Street
Red Deer, Alberta
T4N 6C9

Statistics Canada

Staff of the regional office provide statistical information needed by governments, industry, and the general public to understand the social and economic conditions of the province and country.

The Advisory Services Division helps people identify, obtain, and effectively use statistical information. The Division promotes the use of statistics through visits, talks and meetings to assist potential users with data problems.

Room 215
11010 - 101 Street
Edmonton, Alberta
T5H 4C5

Index

Agriculture 44
  arable land 44
  crops 44
  employment 181
  farm expenses 45, 49
  farm income 47, 49
  investment 44
  irrigation 44
  livestock 44, 60
  machinery and equipment 51
  poultry 60
Altitudes 197
Apprentices 184, 186, 187
Areas
  arable land 44
  forestry 79, 83
Aviation 124
Banks 12, 13
Bituminous sands - see Oil sands
Building permits 74, 76
Census data 153-172, 179
  definitions 174
Cheques cashed 143
Climate 196
Coal 108
  production 107, 108
  reserves 107, 108
Comm nications 188
Construction 71
  building permits 74, 76
  dwelling units 71, 72
  employment in 71, 78, 179
  value 71, 77
Consumer market data 129
  census data 153-172, 179
  income tax data 130-137
  personal income 131, 132, 134-136
  population characteristics 153-172
  price indexes 145-148
  retail trade 138-144
Crops 44
Economic accounts 6, 7
Education and training 183, 185
Electric Power 110
  capacity 110, 112, 113, 114
  consumption 110, 112
  cost 110
  farms served 110
  locations 110
  revenue 113
Employment (also see Labour section)
  by industry 181
  by occupation 181
  in agriculture 181
  in construction 71, 78, 181
  in financial institutions 13, 181
  in manufacturing 20, 181
  in transportation 181
Energy Resources 92
  coal 92, 93, 108, 107
  conservation 115
  electricity 92, 93
  natural gas 92, 93, 95
  oil sands 92, 93, 95, 105
Environment 115, 177
Farm
  electrification 110
  expenses 45, 49
  income 14, 45, 47, 49
  livestock 44, 60
  machinery 51
  number 53, 55
  sales 53, 55
  size 53
  tenure 53
Financial institutions 12, 13
Fisheries 86
Forestry 79
  areas 79, 83
  inventory 79, 83
  management 79, 83
  production 84
  reforestation 79, 85
Fur production 87
Gas, natural
  government revenue from 104
  production 100
  reserves 102, 103
  statistics 100, 101
Geography 190
Geology 194
Government 175
  employment in 181
  revenue from minerals 104
  services 206, 209
Gross domestic product 6
Heritage savings trust fund 10, 11
Highways and roads 120, 122
Hydroelectric developments 110, 202
Income
  farm 14, 45, 47, 49
  personal 14, 15
  taxable 130-137
Indices 145-148
  consumer price 145-147
  industry selling price indexes 148
Industrial assistance 206, 209
Industrial minerals - see Minerals
Investment, private and public 8, 9, 11
Irrigation 44
Labour 182
  apprentices to trade 184, 186, 187
  force 179, 182
  unions 182
Livestock 44, 60
Lumber - see Forestry
Machinery, farm 51
Manpower 178, 180

Manufacturing 20
assistance 22
decentralization 21
employment 20 181
exports 20
historical 23
industries 21
investment 20, 43
location 21, 39-42
markets 20
principal statistics 22-42
Minerals 61
aggregates 63
bentonite 65
bituminous sands - see Oil sands
cement 61
ceramic clays 61
coal 92, 93
dimension stone 63
dolomite 65, 67
gold 67, 69
government revenue from 104
gypsum 63
iron deposits 67
lime 65, 67
limestone 61, 65, 67
magnesium 67
marl 61, 65
natural gas 95
nickel 67
peat moss 65
petroleum 95
production 69
quartz 63
salt 65
salt cake 65
sand and gravel 63
shales 61
silica sand 63
silver 67, 69
sodium sulphate 65
sulphur 65, 69, 70
titanium 67
uranium 67
vanadium 67
zircon 67
Mining, employment 68, 181
Motor transport
truck traffic 120, 123
vehicle registration 120, 123
Natural gas - see Gas, natural
Newspapers 188
Oil and gas industry 95
Energy Resources Conservation Board 95, 108
expenditures 103
government revenues from 104
oil sands 92, 93, 95, 105
pipelines 95
production 100, 101
reserves 102, 103, 107
statistics 96, 100-104
Oil sands 92, 93, 95, 105
People 149, 151
Personal income 14-15, 131-132, 134, 136
Petrochemicals 20
Pipelines 95
Population
age groups 166
birthplace 171
census divisions 153-172
cities, towns, villages 155
dwellings, occupied 170
education 165
ethnic groups 164
families 166, 168
households 168
labour force 179
migration 172
mobility 171, 172
mother tongue 162
religion 163
rural and urban 154
vital statistics 173
Poultry 60
Precipitation 197
Price indices 145-148
consumer 145-148
industry selling price indexes 148
Production
farm 18
forestry 84
manufacturing 18, 23
net value of 16, 17, 18
Radio stations 188
Railways 127
Reserves
coal 92, 93, 107, 108
natural gas 92, 93, 95, 102
oil 92, 93, 95, 102, 105
Retail trade 138
by census divisions 139
by type of outlet 138
Stock exchange 12
Sulphur 65, 69, 70
Tar sands - see Oil sands
Taxes, personal income 131-132, 134-136
Television stations 188
Temperatures 197
Telephones 188
Tourism 88
receipts 88, 90
visitors 88, 90
Trade
employment in 181
retail 138
Transportation 118
aviation 124
employment in 181
highways 120, 122
motor vehicles 120, 123
railways 127
trucking 123
water 128
Trapping 87
Unions, labour 182
Value added, see Production, net value 16, 17, 18
Vital statistics 173
Water 200
environmental policies 177
irrigation 44
power development 110
resources 202
river discharges 204
transportation 128

POOR

QUALITY

ORIGINAL